



كلية العلوم - قسم الجيولوجيا



جامعة أسيوط

امتحان طلاب المستوى الثالث (ساعات معتمدة)
مقرر (٣٤٠ ج) ميكانيكا الصخور و جيولوجيا تركيبية

الزمن : ٣ ساعات

الدرجة الكلية (٧٠ درجة)

يونيه ٢٠٢١

PART I: Final Exam (50 marks)

ROCK MECHANICS (15 marks)

Q1) Label the correct sentence with true (T) and the incorrect one with false (F)

- 1- The finite strain is the sum of all of the incremental strains.
- 2- The process of finding the resultant of two or more forces is called the composition forces.
- 3- Confining stress will cause crystals to align in a preferred orientation (foliation).
- 4- A body force is a force that acts throughout the volume of the deforming rock.
- 5- The stress perpendicular to the plane is called shear stress.
- 6- Homogeneous stress is necessarily isotropic.
- 7- The stress ellipsoid is a construction showing the complete variation in stress with direction.
- 8- The strength of a rock decreases at depth because of the increase in confining pressure.
- 9- The principal planes of stress have no components of normal stress acting on them.
- 10- Decrease in the temperature weakens the rocks.
- 11- Homogeneous stress means stress at any point in the body is of equal magnitude and direction.
- 12- If the two ends of a rod are turned in opposite directions, the rod is subjected to tension.
- 13- Elastic Strain is a strain which cannot be recovered after removal of the deforming force.
- 14- Finite Strain describes separate strain conditions.
- 15- When a force acts perpendicular (or "normal") to the surface of an object, it exerts a shear stress.

باقي الأسئلة في الصفحة التالية

STRUCTURAL GEOLOGY (35 marks)

Q2) Choose the correct words to complete the following phrases:

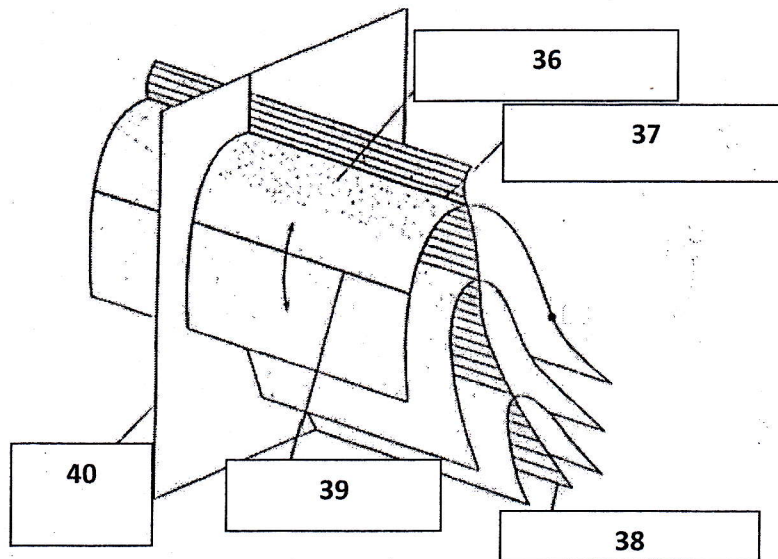
- 16) and are two of the non-tectonic secondary structures.
a- Cross bedding b- Slumping c- Landslides d- Columnar jointing
- 17) is a term used to indicate the direction of movement and rotation that occurred during deformation.
a- Inter limb angle b- Vergence c- Roll over d- hade
- 18) An imaginary plane that is tangential to the hinge zones of a series of small folds is called:
a- Axial surface b- Enveloping surface c- Bedding surface d- Symmetric plane
- 19) A is a series of folds within a particular unit or series of units.
a- Folded belt b- Fold train c- Folded mountain chain d- Drag fold series
- 20) On a listric fault the hanging-wall block rotates around an axis that is
a- parallel to the fault surface b- perpendicular to the fault surface
c- oblique to the fault surface d- of no orientation
- 21) In similar folds
a- maintain constant layer thickness across the folded surface.
b- the layer thickness parallel to the axial surface remains constant.
c- inter-limb angles are equal.
d- The outer layers are more folded than the inner ones
- 22) The angle between fold limbs in the profile plane is called the
a- interlimb angle b- true dip angle c- vergence angle d- apparent fold angle
- 23) In faulting, the horizontal component of dip separation is called
a- Throw b- Heave c- Dip slip d- stratigraphic separation
- 24) A non- cylindrical fold is characterized by
a- no hinge line b- a curved hinge line c- straight hinge line d- refolded hinge line
- 25) Monoclines are fold structures with; the beds on either side of the tilted limb are horizontal.
a- Symmetric axial surface b- Inclined axial plane
c- only one tilted limb d- symmetric limbs

باقى الأسئلة على الصفحة التالية

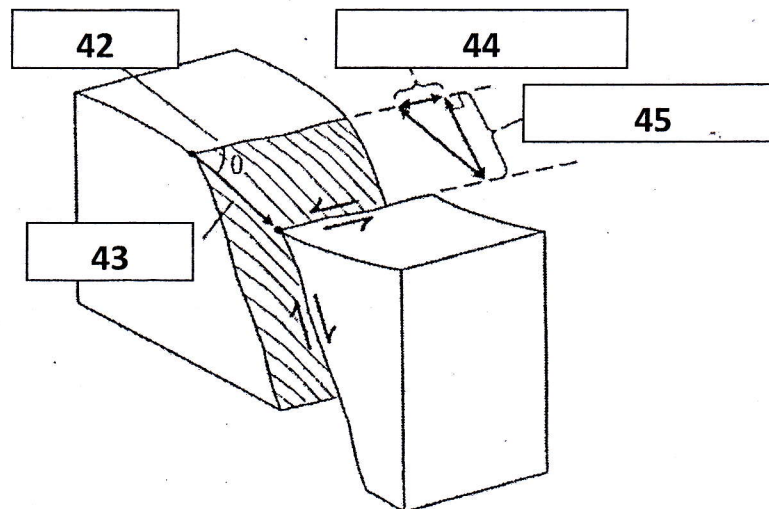
- 26) Exfoliation joints forming near the ground surface in a location where (σ_1) is and while (σ_3) is.....,
 a- horizontal b- parallel to the surface c - inclined d - vertical
- 27) Orientation of a geometric element in space is called
 a- Attitude b - Pitch c - Rake d - Bearing
- 28) Angle of linear element with earth's surface in an imaginary vertical plane :.....
 a-Orientation b-Plunge c- Rake d -Attitude
- 29) In similar folds the layer thickness parallel to the axial surface
 a-Increases b - remains constant c - decreases d- changes irregularly
- 30) Kink folds are small folds that are characterized by
 a- irregular and isolated fold structures b - straight limbs and sharp hinges
 c-with only one tilted limb d- wide crestal areas
- 31) The topographically highest line on a folded surface, which need not coincide with the fold hinge.
 a-Culmination b - Crest c - Klippe d- outlier
- 32) Large-scale recumbent folds often associated with thrust faulting; they are called
 a- Thrust sheets b - nappes c - Duplex d- Orogene
- 33) is a fault rock consisting of loose or loosely bound angular rock fragments often in a gouge matrix.
 a - Mylonite b- Fault gauge c- Fault breccias d -Pseudotachylite
- 34) High point of the hinge line in a noncylindrical fold is called
 a- Depression b - Culmination c -Crest d- Amplitude
- 35) Geologic structure formed before full lithification but after initial deposition is called:
 a- syn-formational b- post-formational c- penetrative d- pene-contemporaneous

باقى الأسئلة فى الصفحة التالية

From the following Figures
Answer the following:

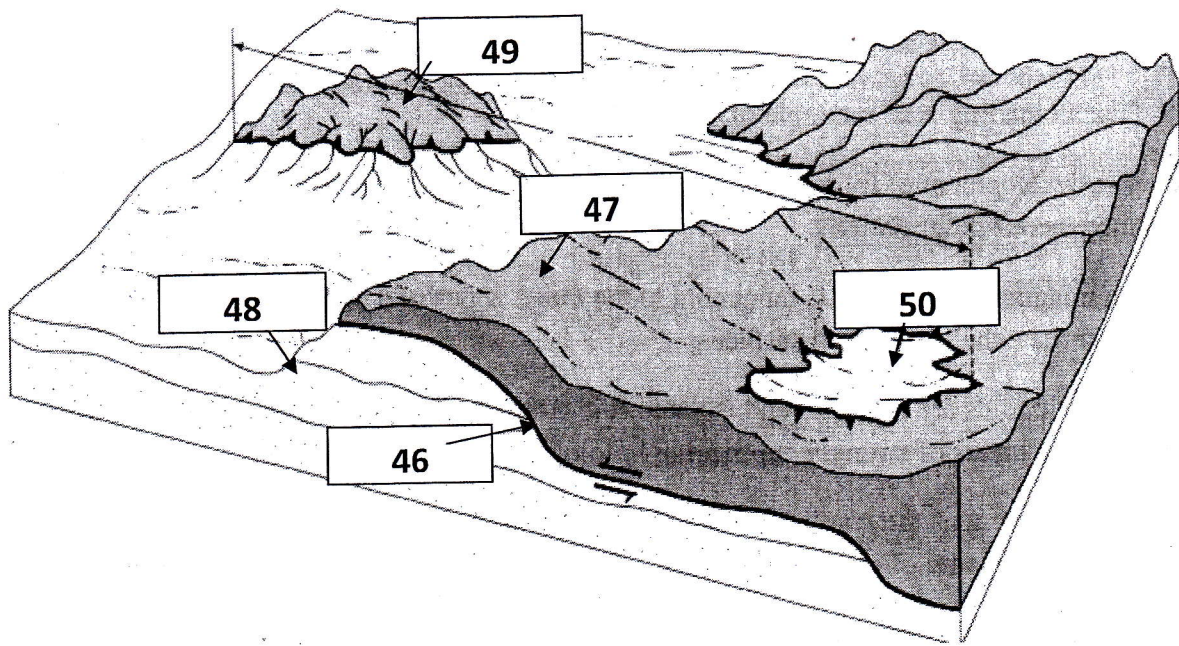


- | | | | |
|-------------------------|----------------------|-----------------------|-------------------------|
| 36) a- Fold area | b-Hinge area | c-Antiform area | d- Inflection area |
| 37) a- strike line | b- intersection line | c- Hinge line | d- Profile line |
| 38) a- Bedding surface | b-Axial surface | c- Enveloping surface | d- anticlinal surface |
| 39) a- projection line | b- Fold axis | c- Fold orientation | d - Hinge line |
| 40) a- Anticlinal plane | b- Profile plane | c- Cross bedding | d- Nothing of the above |



- 41- The fault is: a - oblique normal fault b-Listric fault
c- Oblique-slip normal fault d- strike slip fault
- 42) a- Attitude angle b- Rake angle c- Dip angle d- Hade angle
- 43) a- Net slip b- Fault slip c- dip-slip component d- Throw
- 44) a-Strike-slip component b- Hade c- stratigraphic separation d- Net slip
- 45) a-Dip-slip component b- Throw c-Vertical separation d- Net slip

باقى الأسئلة فى الصفحة التالية



- 46) a- Normal fault b- Thrust fault c- Bedding surface d- Strike-slip fault
 47) a- Duplex b- Allochton c- Foot wall d- Older rocks
 48) a- Hanging wall b- Autochton c- Imbricate fan d- basal unit
 49) a- Fault block b- Cap rock c- Klippe d- Hanging wall
 50) a- Structural basin b- Window c- Rift d- Topographic depression

PART II ORAL and Midterm EXAM (20 Marks)

Label the correct sentence with true (T) and the incorrect one with false (F)

- 51- Stress that acts to lengthen an object is called compression stress.
- 52- Directed stress is associated crumpled with mountain building processes when rock is squeezed, and stretched as one continent slides over the edge of another.
- 53- Plastic strain is a form of strain in which the distorted body returns to its original shape and size when the deforming force is removed.
- 54- Elastic strain is responsible for the behavior of seismic waves in rock.
- 55- Stress ellipsoid is defined by three orthogonal axes directed parallel to principal planes.
- 56- Brittle substances are those that undergo a large plastic deformation before rupture.
- 57- Lithospheric pressure depending on composition, porosity and pore fluids.

باقى الأسئلة فى الصفحة التالية

58- Rocks are plastic and ductile near the earth's surface.

59- Glacial loading is an example of surface forces.

60- The development of folds and boudins in straight layering are expressions of inhomogeneous deformation.

61- An imaginary plane that is tangential to the hinge zones of a series of small folds. We call this curved surface the enveloping surface.

62- Parasitic folds are irregular and isolated fold structures that typically occur as tightly folded veins or thin layers of strongly contrasting lithology.

63- Direct Folding is the result of deformation by shearing due to the action of a couple force lying in a horizontal plane.

64- Faults whose dip decreases progressively with depth have been given the special name listric faults.

65- Graben structure is bounded by normal fault from one side.

66- Continuous structures occur through the rock body at all scales.

67- Plunge is the angle of linear element with earth's surface in an imaginary vertical plane

68- Trough is the topographically lowest point of a fold, which need not coincide with the fold hinge

69- The term fold generation refers to groups of folds that formed at approximately the same time interval and under similar kinematic conditions.

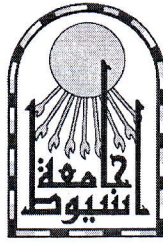
70- Normal faulting occurs where σ_2 and σ_3 are horizontal and σ_1 , is vertical.

GOOD LUCK _____

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Geology Department



Second Semester Exam.
2020 - 2021
Time: 2 hours

Sedimentary Environments and Sedimentary Basins (G335)

Answer the following questions: (100 Marks)

تنبيه هام : يتم طمس (تسويد) الاجابة المختارة من قبل الطالب باستخدام القلم الجاف فقط في ورقة الاجابة المنفصلة عن الأسئلة

PART ONE [Allocated to Final Exam] (50 Marks)

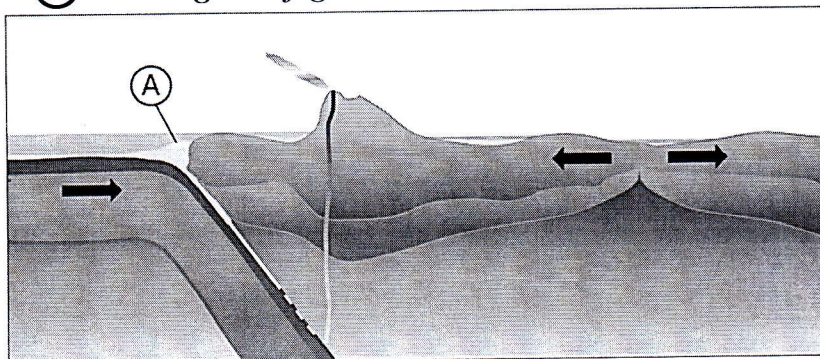
Q1: Choose the correct answer A, B, C or D (one mark each): (35 Marks)

- Deserts with a pebble surface are called _____
(A) Draas (B) Barchans
(C) Regs (D) Ergs
- Large fan-shaped deposits of fine-grained sediments that accumulated on the continental rise are called _____
(A) Submarine fans (B) Atolls (C) Alluvial fans (D) Spits
- Sedimentary basins may change in size & shape due to _____
(A) Erosion (B) Sedimentation (C) Tectonic activity (D) All of these
- As a river overflows its bends during flood, it drops much of its coarse-grained load immediately, forming land forms called _____
(A) Deltas (B) Alluvial fans (C) Natural levees (D) Point bars
- A delta is made up of sediments _____
(A) Deposited at the mouth of a river
(B) Deposited on the inside of a meander loop
(C) Deposited at a mountain front
(D) Deposited on the outside of a meander loop

6. Which of the following statement is false?

- (A) Tsunamis can be generated by landslides
- (B) Tsunamis can be generated by volcanic eruptions
- (C) Tsunamis can be generated due to the gravitational attraction between the Earth and the moon
- (D) Tsunamis can be generated by Meteorite impacts

7. Letter (A) in the given figure shows the location of _____ basin



- (A) Back-arc
- (B) Trench
- (C) Rift
- (D) Foreland

8. Continental sedimentary environment is represented by _____

- (A) Coastal sediments
- (B) Pelagic sediments
- (C) Aeolian sediments
- (D) Deltaic sediments

9. The transformation of semi-arid regions into deserts is called _____

- (A) Deflation
- (B) Deforestation
- (C) Detoxification
- (D) Desertification

10. Tidal flat sediments are characterized by _____

- (A) High angle planar cross – bedding
- (B) Herringbone cross-bedding
- (C) Convolute bedding
- (D) Slump – bedding

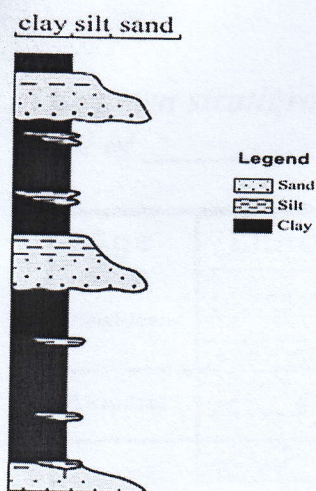
11. Which of the following statement is false?

- (A) Wind is a more effective erosion agent in wet climates
- (B) Wind is a more effective erosion agent in dry climates
- (C) Wind is an equally effective erosion agent in wet and dry climates
- (D) Wind does not cause erosion

12. Bed load fluviatile sediments are represented by _____

- (A) Carbonates
- (B) Black shales
- (C) Conglomerates and sandstones
- (D) Phosphorites

The given figure represents _____



- (A) Symmetrical cycles
 (B) Asymmetrical cycles
 (C) Truncated cycles
 (D) Gradational cycles

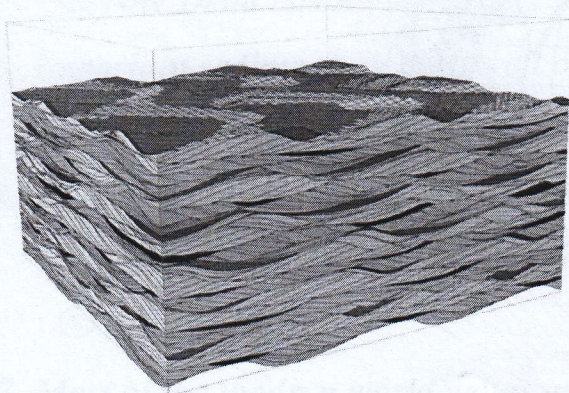
14. Which of the following would you least expect to find in a desert?

- (A) Playa lakes
 (B) Rounded, soil-covered hills
 (C) Steep river valleys and gorges
 (D) Dune fields

15. Ripples are generally oriented _____ to the current direction

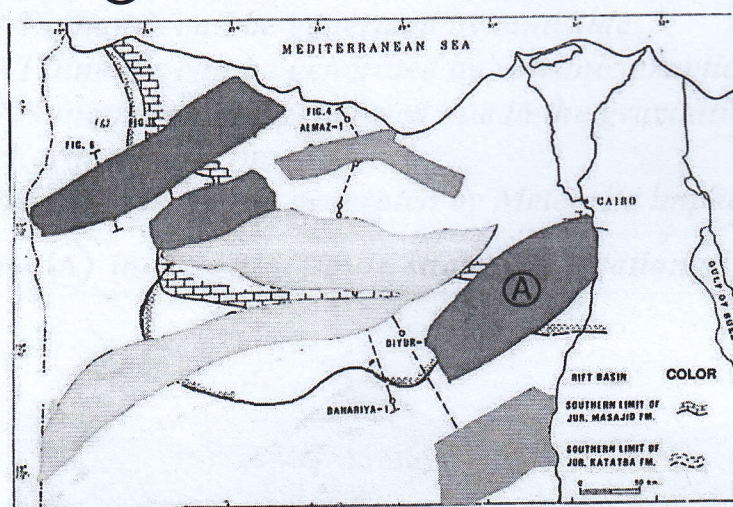
- (A) Parallel
 (B) 30 degrees
 (C) 45 degrees
 (D) Perpendicular

16. The given figure represents _____



- (A) Wavy-bedding
 (B) Lenticular-bedding
 (C) Flaser-bedding
 (D) Trough cross-bedding

17. Letter (A) marks the location of _____ in Egypt



- (A) Abu El Gharadiq basin
- (C) Komombo basin

- (B) Gulf of Suez basin
- (D) El Gindi Basin

18. The given map represents _____



- (A) Global distribution of sedimentary basins
- (B) Global distribution of modern aeolian sediments
- (C) Global distribution of tidal flat sediments
- (D) Global distribution of deltaic sediments

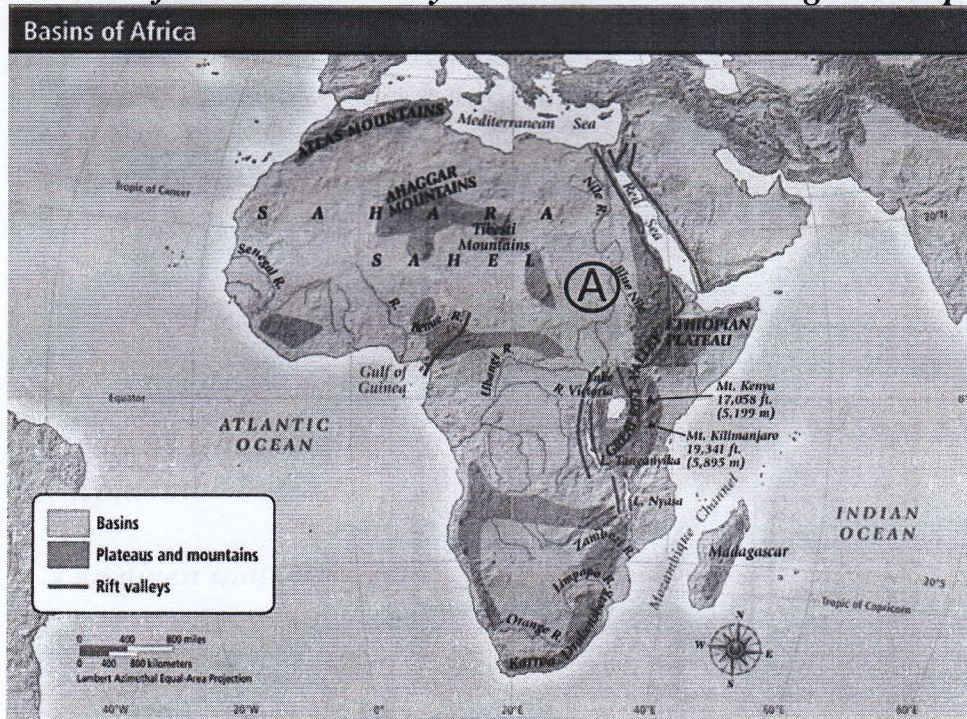
19. Most of the productive sedimentary basins of Egypt are _____

- (A) Offshore basins
- (C) Back-arc basins

- (B) Onshore basins
- (D) Offshore-onshore basins

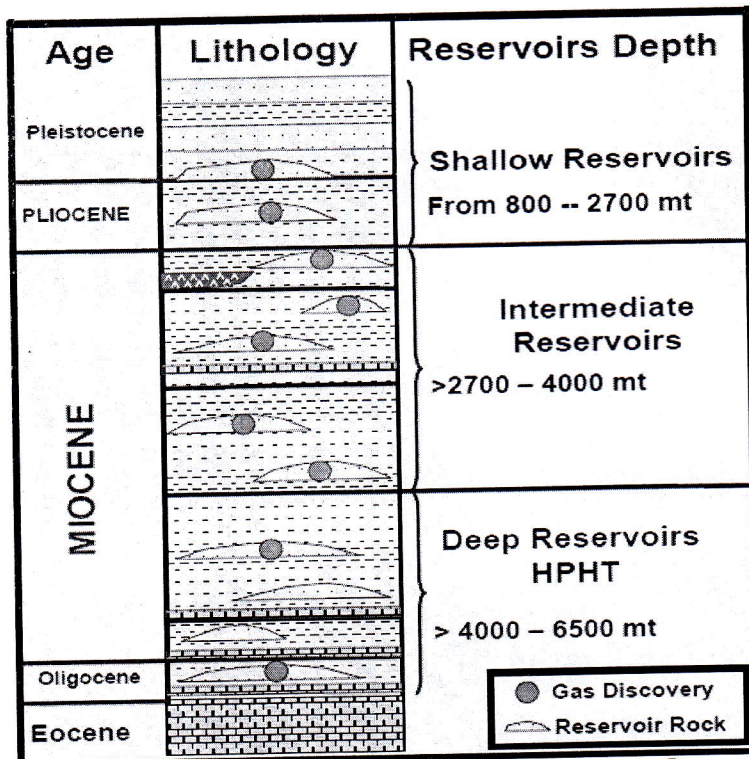
20. Which of the following is not an important source of dust?
- (A) Volcanic dust from eruptions
 - (B) Clay minerals from soils
 - (C) Organic sources, including charcoal, pollen and bacteria
 - (D) Earthquakes activity

21. Which African sedimentary basin is missed on the given map marked by letter (A) ?



- (A) Congo basin
 - (B) Sudan basin
 - (C) Kalahari basin
 - (D) Chad basin
22. Excellent examples of modern aeolian sediments are well documented in Egypt at _____
- (A) Western Desert
 - (B) Red Sea region
 - (C) Nile Valley region
 - (D) Sinai
23. Which of the following can be applied to describe the sedimentary basins according to the style of deformation?
- (A) Active basins
 - (B) Slightly deformed
 - (C) Elongated basins
 - (D) Symmetrical basins

24. The given stratigraphic column represents the sediments sequence observed in oil field of _____



- (A) Komombo basin (B) Abu El Gharadiq basin
 (C) Nile Delta basin (D) Shushan basin

25. Important sedimentary basins all over the world were estimated to be _____

- (A) 100 (B) 974 (C) 267 (D) 589

26. Fluvial sediments are of great economic importance for _____

- (A) Cement and ceramic industries (B) Fertilizer industry
 (C) Steel industry (D) Medical industries

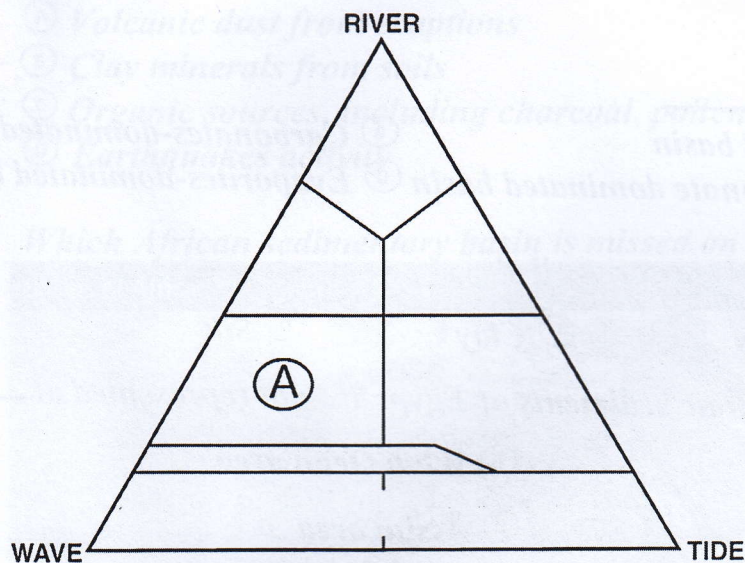
27. Most of the modern world deltas are related to _____ type

- (A) Tide-dominated (B) Wave- dominated
 (C) Mixed processes (D) Fluvial-dominated

28. Which one of the following generally decreases downstream along the length of a stream?

- (A) Channel width (B) Channel depth (C) Gradient (D) Velocity

29. In the given figure, letter (A) marks the location of _____



(A) River-dominated delta

(B) Tide-dominated estuary

(C) Wave-dominated estuary

(D) Wave-dominated delta

30. At a bend in a river _____ occurs on the outside of the bend and _____ occurs on the inside of the bend

(A) Erosion.....Deposition

(B) DepositionErosion

(C) Erosion.....Erosion

(D) Deposition.....Deposition

31. The given photo which is built up exclusively of sandstones represents _____



(A) Fluvial – related sediments

(B) Aeolian- related sediments

(C) Marine – related sediments

(D) Deltaic- related sediments

32. Komombo basin represents_____

- Ⓐ Siliciclastics – dominated basin Ⓑ Carbonates-dominated basin
 Ⓒ Mixed siliciclastics-carbonate dominated basin Ⓓ Evaporites-dominated basin

33. Deposits of windblown silt and clay are called_____

- Ⓐ Dunes Ⓑ Loess Ⓒ Clay Ⓓ Silt

34. Ancient Upper Cretaceous deltaic sediments of Egypt are not represented at_____

- Ⓐ Komombo area Ⓑ Wadi Qena area
 Ⓒ Gebel Duwi area Ⓓ Assiut area

35. The given figure represents _____

Era	Period	Stage	Fm.	Lithology	Sr.	Res.	Seal
Cenozoic	Oligocene		Dabaa				●
	Eocene		Apollonia		●		●
Mesozoic	Upper Cretaceous	Camp.-Mast.	Khormen				●
		Conia.-Sant.	A		●	●	●
		Turonian	B		●	●	●
			C		●	●	●
			D		●	●	●
			E		●	●	●
			F		●	●	●
			G		●	●	●
		Cenomanian	U.		●	●	●
			L		●	●	●
	Lower Cretaceous	Alpian	Kharita		●	●	●
		Aptian	Dahab			●	●
		Barremian	Amm Et-Baieb		●	●	●
		Hauterivian					
		Valanginian	Betty		●		●
		Bermsian					
	Jurassic		Eghi			●	
	Pre-Cambrian		Basement				

- Ⓐ Abu El Gharadiq basin Ⓑ Nile delta basin
 Ⓒ Komombo basin Ⓓ Beni Suef basin

Q2: Answer (T) for True sentences or (F) for False sentences (One mark each): (15

36. Delta forms only where rivers enter seas

(T)

(F)

37. Miocene sediments accumulation of the Red Sea of Egypt are related to rifting mechanisms

(T)

(F)

38. No marked variation in sediments thickness can be observed in the post-depositional sedimentary basins

(T)

(F)

39. Aeolian sediments are important for cement industry

(T)

(F)

40. Soil treatment sediments were deposited in Egypt mainly in marginal settings

(T)

(F)

41. Dolomites are related mainly to supratidal settings

(T)

(F)

42. All the sedimentary basins of Egypt belong to the same age

(T)

(F)

43. Flood plain and bed load fluvial sediments are used for the same industrial purposes

(T)

(F)

44. Paleocurrent can be defined from studying the deformational primary sedimentary structures

(T)

(F)

45. Bentonite occurs only in the Western Desert of Egypt

(T)

(F)

46. Pelagic sediments are located within the marine environment shallower than the neritic one

(T)

(F)

47. Grain size is used for the interpretation of energy prevailing during sedimentation

(T)

(F)

48. Geometry of sedimentary rocks doesn't help in environmental interpretation

(T)

(F)

49. Cosmogenous materials are well documented in the marine sediments of Egypt

(T)

(F)

50. Decorative rocks were mainly accumulated in Egypt in non-marine settings

(T)

(F)

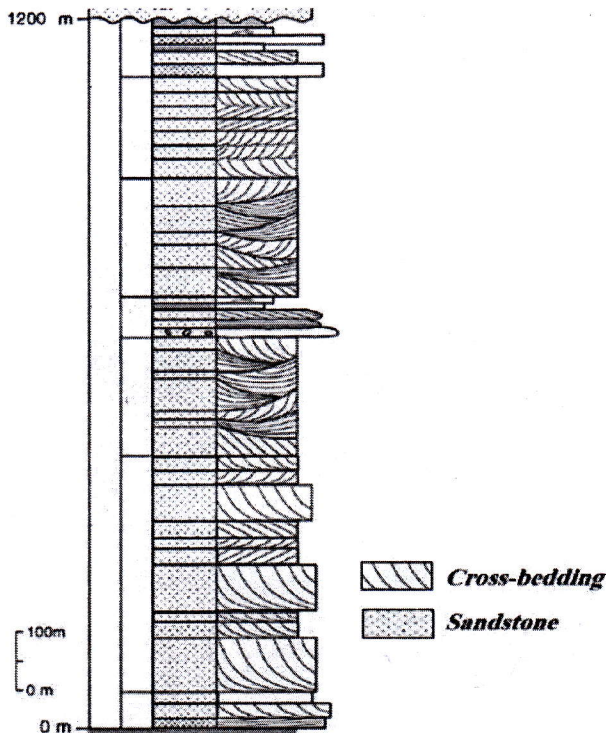
PART TWO

*Allocated to Mid Term Exam.,
Oral & Activity*

(50 Marks)

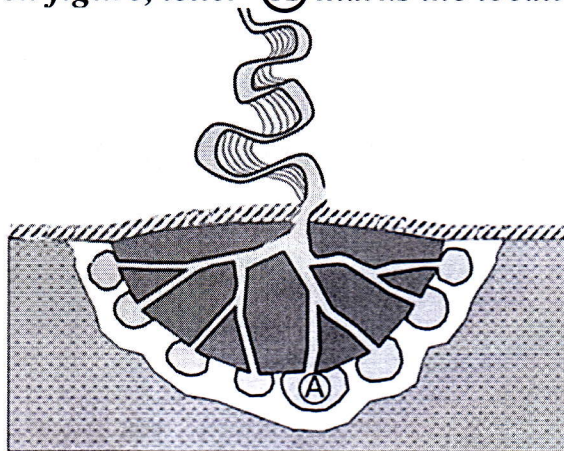
Q3: Choose the correct answer A, B, C or D (one mark each): (28 Marks)

51. Fossils and trace fossils are important for environmental interpretation in particular to determine the _____
Ⓐ Salinity Ⓑ Temperature Ⓒ Water depths Ⓓ All of these
52. Geologic processes powered by the wind are called _____ processes
Ⓐ Barchan Ⓑ Coriolis Ⓒ Eolian Ⓓ Yarding
53. Bimodal cross-bedding, wavy and lenticular bedding are characteristically occurring in _____ system
Ⓐ Aeolian Ⓑ Deltaic Ⓒ Fluvial Ⓓ Tidal flat
54. The given figure represents sequence of sediments accumulated by _____



- Ⓐ Aeolian processes Ⓑ Marine processes
Ⓒ Fluvial processes Ⓓ Tidal flat processes
55. The largest sedimentary basin all over the world is represented by _____
Ⓐ Junggar basin Ⓑ Congo basin
Ⓒ Amazon Basin Ⓓ Atlantic basin

56. In the given figure, letter (A) marks the location of _____

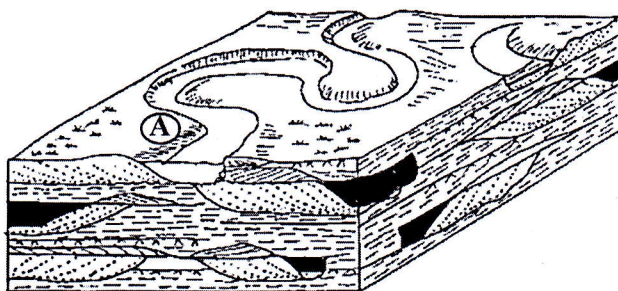


- (A) Distributary mouth bar (B) Delta plain (C) Delta front (D) Prodelta

57. The area of Abu El Gharadiq basin is _____

- (A) 18000 km² (B) 9000 km² (C) 16000 km² (D) 12000 km²

58. Letter (A) in the given figure marks the location of _____



- (A) Point bar (B) Levee (C) Channel deposits (D) Flood plain deposits

59. How many high tides are there in a day?

- (A) 1 (B) 2 (C) 3 (D) 4

60. Sigmoidal cross-bedding is characteristically related to _____ sediments

- (A) Aeolian (B) Fluvial (C) Tidal flat (D) Deep marine

61. Which of the following is the largest sedimentary basin of Egypt?

- (A) Nile Delta basin (B) Komombo basin
(C) Beni Suef basin (D) Gulf of Suez basin

62. Which of the following is more important in paleoenvironmental interpretation?

- (A) Lithology (B) Primary sedimentary structures
(C) Facies model (D) Faunal content

63. The given photo represents_____



- Ⓐ Sand dunes
- Ⓒ Desert mushroom

- Ⓑ Sand sheets
- Ⓓ Pedestal rock

64. Economic coal deposits are well represented in Egypt at_____

- Ⓐ Red Sea
- Ⓑ Northern Sinai
- Ⓒ Nile Valley
- Ⓓ Western Desert

65. Glauconite of Egypt was accumulated under_____ system

- Ⓐ Aeolian
- Ⓑ Tidal flat
- Ⓒ Fluvial
- Ⓓ Marine

66. The given photograph exhibits _____distinct lithofacies

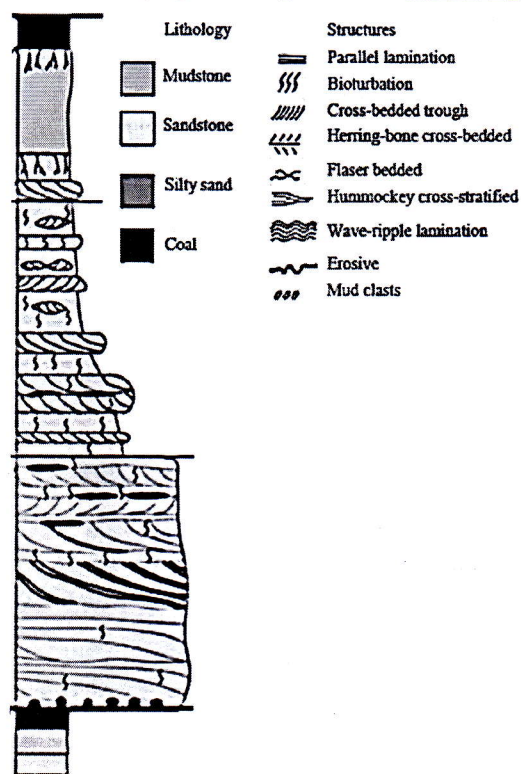


- Ⓐ One
- Ⓑ Two
- Ⓒ Three
- Ⓓ Five

67. The most widespread ancient sediments of Egypt are represented by_____ sediments

- Ⓐ Aeolian
- Ⓑ Fluvial
- Ⓒ Tidal flat
- Ⓓ Marine

68. The given figure represents _____



- (A) Fluvial related- sediments
 (C) Aeolian related- sediments

- (B) Tidal flat related- sediments
 (D) Deltaic related- sediments

69. The given figure represents _____



- (A) Asymmetrical coarsening upward cycles
 (B) Symmetrical coarsening upward cycles
 (C) Asymmetrical fining upward cycles
 (D) Symmetrical fining upward cycles

70. Mangrove are frequently observed in _____ environment

- (A) Aeolian (B) Tidal flat (C) Fluvial (D) Deltaic

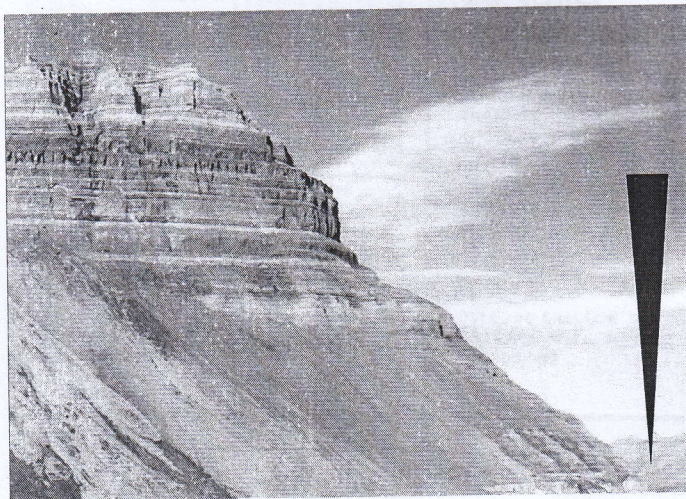
71. The highest point of sand dunes is called _____

- (A) Crust (B) Crest (C) Butte (D) Pinnacle

72. The pelagic sediments are deposited as _____

- (A) 0.001 cm/year (B) 1cm/year
(C) 10cm/year (D) 20cm/year

73. The given photo represents sequence of sediments related to _____



- (A) Fluvial system (B) Deltaic system
(C) Aeolian system (D) Tidal flat system

74. The rate of subsidence is commonly varying in sedimentary basins between _____

- (A) 1-20 cm/year (B) 100-200cm/year
(C) 1-2km/year (D) 7-8km/year

75. Beach sediments are characterized by _____ grains.

- (A) Very angular (B) Angular
(C) Subangular (D) Well rounded

76. How does desert pavement form?

- (A) By intense chemical weathering (B) By stream erosion
(C) By intense mechanical weathering (D) By wind erosion

77. Zohr gas field was discovered in _____

- (A) 2012 (B) 2014 (C) 2015 (D) 2017

8. The given figure represents _____

TIME UNITS		ROCK UNITS	LITHO.	LITHOLOGY & ENVIRONMENT
CENOZOIC	TERTIARY	MIOCENE	MOGHRA	CONTINENTAL CLASTICS
		OLIGOCENE	DABAA	FLUVIOMARINE CLASTICS AND CARBONATES
		EOCENE	APOLLONIA (QUINDI)	OPEN MARINE CARBONATES
		PALEOCENE		
MESOZOIC	UPPER CRETACEOUS	MAESTRICH CAMPANIAN	KHOMAN	OPEN MARINE CHALK SHALE
		SANTONIAN	ABU ROASH A B C D E F G	ALTERNATING SEQUENCE OF MARGINAL MARINE CLASTICS AND SHALLOW MARINE CARBONATES
		TURONIAN		
		CENOMANIAN		
		BAHARIYA		
		ALBIAN		
	LOWER CRETACEOUS	APTIAN	ALAMEIN	SHALLOW MARINE DOLOMITE AND LIMESTONE
		BARREMIAN NEOCOMIAN	SHALTUT	FLUVIAL AND FLUVIOMARINE CLASTICS
		JURASSIC	UPPER MASAJID	ALTERNATING CYCLES OF FLUVIAL AND MARGINAL MARINE CLASTICS AND SHALLOW MARINE CARBONATES
		MIDDLE	KHATATBA	
		LOWER	WADI AL KHAUN	
PALEOZOIC	DEVONIAN	GHAZALAT		FLUVIAL TO SHALLOW MARINE CLASTICS WITH IGNEOUS INTRUSIONS
	SILURIAN	ACACUS		
	ORDOVICIAN	GARGAF		
	CAMBRIAN			
PRECAMBRIAN		BASEMENT		

- (A) Abu El Gharadiq basin
(C) Komombo basin

- (B) Nile delta basin
(D) Beni Suef basin

Q4: Answer (T) for True sentences or (F) for False sentences (One mark each): (22 Marks)

79. Fertilizer materials of Egypt were accumulated in marine environment

(T) (F)

80. Deltaic sediments are important sites for hydrocarbon accumulation

(T) (F)

81. Both lagoonal and lake sediments are quite similar

(T) (F)

82. Rift basins are related to plate divergent boundaries

(T) (F)

83. *Trough cross – bedding is the main primary sedimentary structure characterizing the aeolian sediments*
☐ T ☐ F
84. *Wind is one of the main processes affecting the marine environment*
☐ T ☐ F
85. *Sediments lithology are not indicative of paleoclimate*
☐ T ☐ F
86. *The Quseir Formation of Egypt was deposited in marginal environment*
☐ T ☐ F
87. *Sedimentary cycle is characterized either by vertical variation in primary sedimentary structures and/or the change in lithology*
☐ T ☐ F
88. *The Nubia Sandstone in Egypt was deposited mainly under fluvial system*
☐ T ☐ F
89. *Braided and Meandering rivers may form in high gradient areas*
☐ T ☐ F
90. *In the marine environment, biogenous sediments are derived mainly from the hinterland*
☐ T ☐ F
91. *Facies model of both fluvial and deltaic sediments are similar*
☐ T ☐ F
92. *The glass sand of Egypt was deposited in marine environment*
☐ T ☐ F
93. *Placer deposits occur in both deltaic and fluvial systems*
☐ T ☐ F
94. *Aeolian sediments are restricted only in Egypt to the Cretaceous time*
☐ T ☐ F

95. *Fan deltas and submarine fans are located at the same position within the depositional environment*

☐ T

☐ F

96. *Marked variation in sediments thickness can be observed in the syn-depositional sedimentary basins*

☐ T

☐ F

97. *Volcanogenous material is more frequent in the onshore basins than the offshore ones*

☐ T

☐ F

98. *During Neogene period, Egypt was subjected to strong rainfall and torrents*

☐ T

☐ F

99. *Transtensional and transcompressional basins are related to horizontal stresses (lithosphere shearing)*

☐ T

☐ F

100. *A ventifact is a stone eroded by the sand-blasting effect of the wind*

☐ T

☐ F

Ezzat A. Ahmed

Good Luck

Environmental Geochemistry G330

Final Exam

Assiut University
Faculty of Science
Geology Department

Date : 1st of July 2021
Time allowed : two hours
Total points : 50
No. of Pages : 8

Answer the following questions

Answer only 40 questions from the following:

1) What are the kind of emitted radiation when radioactive decay takes place?

2) How is the radioactivity measured?

3) What is the difference between Dose & Exposure in radioactivity?

4) What are the Naturally Occurring Radioactive Materials (NORM)?

5) What are the main contributors of the "Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)"

6) What do you know about the extraction of Gold Using cyanide solution (Merrill-Crowe process) .

7) Why cyanide is difficult to analyze ?

8) Write about the Toxicity of Cyanide.

9) What are the chemical processes responsible for reducing the toxicity of cyanide?

10) What are the heavy metals of concern in environmental geochemistry?

11) What is the natural origin of Mercury in the environment?

12) What are the major , significant and minor sources of Mercury pollution?

- 13) What are the natural sources of Lead? Where by man-made?**
- 14) In which form Lead is found in mineralogy and in solution?**
- 15) What are the isotopic tracers of Lead?**
- 16) Why do we care about Arsenic in groundwater**
- 17) Does As correlate with other elements?**
- 18) What are the sources of As?**
- 19) At what depth arsenic is at highest levels in underground wells?**
- 20) Are microbes involved in Arsenic pollution?**
- 21) What are the species of Arsenic in geochemistry?**
- 22) What is the relation of As to Fe in underground water wells?**

Environmental Geochemistry G330

Answer only ten questions from this part

23) Comment : "Cement production can cause environmental problems"

24) Environmentally describe the Cement Kilns.

25) Write what do you know about Wet and Dry Process Kilns

26) What are the types of Fuel used in Cement Kilns?

27) What do you know about "Dioxins and furans"

28) How are dioxins created?

Environmental Geochemistry G330

29) Mention the Pollutants Released by Cement Kilns

30) Are "Test Burns" reliable in Cement production? Why?

31) What are the beneficial uses of solid waste of Cement?

32) What's in Cement Kiln Dust?

33) "Cement Kiln Dust More Toxic when Burning Hazardous Waste" Explain

34) Mention all types of the nonrenewable energies.

Environmental Geochemistry G330

35) What are the two types of Natural gas?

36) What's meant by Biomass.

37) What do you know about "Geothermal Energy"

38) What are the problems with "Marine Energy"

39) How many types of hazardous waste could be found in the environment?

40) What is the importance and benefits of waste recycling

40) What are the "economic effects" of recycling?

41) How paper waste is recycled

42) What are the effects of waste and poor waste disposal?

Environmental Geochemistry G330

Ain Shams University
Faculty of Science
Geology Department

Date: / /
Time allowed: :
Total points: :
No. of Pages: 1

43) What are the "economic effects" of recycling?

Answer only 40 questions from the followings

1) What are the kind of emitted radiation when radioactive decay takes place?

2) How is the radioactivity measured?

3) What is the difference between Dose & Exposure in radioactivity?

4) What are the Naturally Occurring Radioactive Materials (NORM)?

5) What are the main contributors of the "Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)"

A- Final Examination (50 marks)

i. Choice the correct answer (one mark for each one)

- 1- Ring dykes are commonly steeply dipping outward. a-True b- false
- 2- Cone sheets are commonly steeply dipping inward. a-True b- false
- 3- Dykes are igneous bodies extruded parallel to the bedding of the country rocks. a-True b- false
- 4- Veins are created by igneous activities. a-True b- false
- 5- Sills are igneous bodies intruded across the beds of the country rocks. a-True b- false
- 6- Veins are discordant dyke-like fractures. a-True b- false
- 7- Chilled margins indicate emplacement of magmas in cold enveloping country rocks. a-True b- false
- 8- Sharp contacts indicate emplacement of shallow depth magmas in country rocks. a-True b- false
- 9- Zones of hybrid magma suggest that one magma intruded into or against another. a-True b- false
- 10- Laccoliths are discordant, mushroom – shaped intrusions. a-True b- false
- 11- Laccoliths form convex-shaped masses of igneous rocks with a flat base and domed top. a-True b- false
- 12- Laccoliths are concordant intrusive masses with depressed upper middle parts. a-True b- false
- 13- Phacoliths are lens-shaped intrusions situated in the crests of anticlines or troughs of synclines. a-True b- false

- 14- Epizonal plutons are largely concordant with the regional structure of the country rocks.
a-True b- false
- 15- Granite batholiths are large outcrops $> 100 \text{ km}^2$ with irregular and steeply outward dipping walls.
a-True b- false
- 16- Columnar jointing is primary joints that break rocks into hexagonal columnar joints.
a-True b- false
- 17- Foliations of metamorphic rocks are developed as a result of parallel arrangement of planar minerals (e.g. feldspar, amphibolite and micas).
a-True b- false
- 18- Fracture cleavage is closely spaced jointing along which no slip has taken place.
a-True b- false
- 19- Slaty cleavage is defined by strong dimensionally preferred orientation of phyllosilicates(e.g. micas and chlorite)
a-True b- false
- 20- Slip cleavage are finitely spaced subparallel surfaces of cleavage along which slip has taken place.
a-True b- false

ii. **Choice the correct answer (one mark for each one)**

- 21- laccoliths are created when magmas are:
a- Rising upwards b- Moving downwards
c- Moving in horizontal directions
- 22- Laccoliths rocks develop from:
a- Basic magmas b- Intermediate magmas c- silicic magmas
- 23- Lopoliths are concordant intrusive masses derived from:
a- Basic magmas b- Intermediate magmas c- Silicic magmas
- 24- Boss is a term applied to stocks with:
a- Circular section b- Rectangular section
c- Triangular section

- 25- Diapirs are bodies of magmas that are buoyant and moving:
a- Upwards piercing the country rocks
b- Moving downwards piercing the country rocks
c- Moving in a horizontal trend intruding the country rocks
- 26- Ripples marks in sedimentary rocks are formed by
a- Moving wind or water b- heating and cooling
c- Drying and shrinking
- 27- Remains or traces of ancient plants and animals that are preserved in rock are called
a- minerals b- concretions c- fossils
- 28- The layering of sedimentary rock with coarse grains at the bottom and fine grains at the top is
a- foliation b- graded bedding c- cross-bedding
- 29- What is the name for the type of unconformity that exists where younger sedimentary rocks rest on a mass of igneous rocks?
a- Disconformity b- Nonconformity c- Paraconformity
- 30- Which of the following statements about unconformities is true?
a- They all represent the same amount of missing time.
b- They represent a gap in the geologic rock record.
c- A disconformity forms between two metamorphic rocks.
- 31- Geological processes operating at the present time are the same processes that have operated in the past" is a statement of:
a- Faunal Succession b- Uniformitarianism c- Evolution
- 32- Rain prints can occur in.....
a- igneous rocks only b- Sedimentary rocks only
c- Metamorphic rocks only

33- Variation of palaeocurrent direction is minimum in the deposits formed by:

- a- Glacial processes b- Fluvial processes c- Aeolian processes

34- Graded beds are the result of deposition by.....

- a- rivers b- wind c- turbidity currents

35- Which one of the following is not a sedimentary structure?

- a- Dike b- Ripple mark c- Mud crack

36- The process whereby organisms burrow through the sediment is:

- a- Lithification b- sedimentation c- bioturbation

37- Which of the following is not part of the formation of an angular unconformity?

- a- Erosion b- Tilting c- Metamorphism

38- Which of the following does not provide evidence of shallow water environment?

- a- Lamination b- Ripple marks c- Mud cracks

39- Ripples marks caused by flow of water or wind in random directions.

- a- Symmetrical ripples b- Asymmetrical ripples
c- Interference ripples

40- The layered arrangement in sedimentary rocks is called

- a- Mud cracks b- Stratification c- Rain prints

41- Which of the following sedimentary structures is common in sand dunes?

- a- cross-bedding b- trace fossils c- graded bedding

42- A short time break or a change in sediment type in a depositional environment results in the creation ofbetween individual beds.

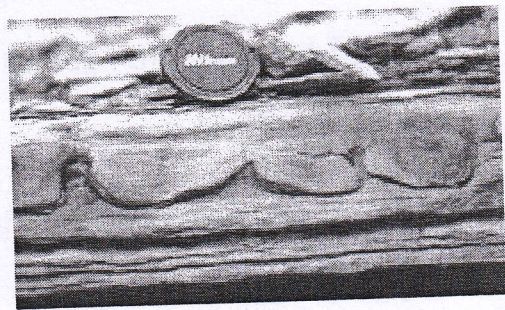
- a- an unconformity b- a graded bed c- a bedding plane

43- The bedding involving crater shaped depressions is.....

- a- Mud cracks b- Rain prints c- Ripple marks

44- The showing field photo represents structure.

- a- flame
b- load
c- flute



45- Each layer of a laminated structure of sedimentary rock is called

- a- Strata b- Leaf c- Lamina

46- Lamination is structure formed in which type of sedimentary rocks?

- a- Fine grained b- Medium grained c- Coarse grained

47- The structure most prevalent to clastic rocks is

- a- nodular structure b- stratification c- concretionary structure

48- The showing field photo represents contact

- a- depositional
b- fault
c- intrusive



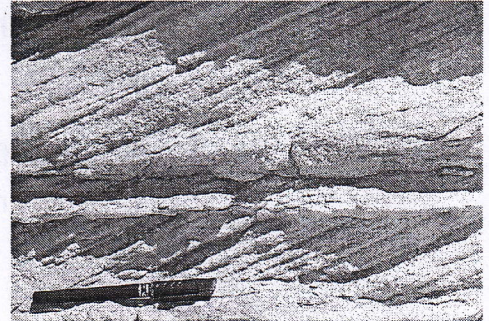
49- The showing field photo represents structure.

- a- dwelling
- b- crawling
- c- feeding



50- In the showing field photo of cross bedding, the wind was blowing.

- a- $\Rightarrow$
- b- $\Leftarrow$
- c- $\Leftrightarrow$



B- Oral Examination (10 Mark)

iii. Choice the correct answer (one mark for each one)

51- The process whereby rocks are changed to sediment is called.....

- a- Compaction
- b- weathering
- c- compaction

52- Only one instrument do not use for measuring the angles in a traverse.

- a- compass
- b- chain
- c- theodolite

53- The distance in the field can be measure by

- a- chain
- b- total station
- c- both of these

54- The difference in elevations can be measure by

- a- level and rod
- b- chain
- c- clinometer

55- The Brunton compass has

- a- hand level
- b- clinometer
- c- both of these

42- A short time break or a change in sediment type in a depositional environment results in the creation ofbetween individual beds.

- a- an unconformity b- a graded bed c- a bedding plane

43- The bedding involving crater shaped depressions is.....

- a- Mud cracks b- Rain prints c- Ripple marks

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- a- depositional
b- fault
c- intrusive





Section I: Final exam

(Total 50 marks)

A- Choose the correct answer for each of the following (one mark/ each)

1. Two hosts are required in
 - (a) *Plasmodium* spp.
 - (b) *Enterobius vermicularis*
 - (c) *Giardia* sp.
 - (d) *Trichomonas hominis*
2. Infective stage of *Heterophyes heterophyes* is encysted in
 - (a) Grasses
 - (b) Snails
 - (c) Sheep
 - (d) Fish
3. Cercariae of *Schistosoma* and *Fasciola* are different in the following except
 - (a) Tail
 - (b) Penetrating glands
 - (c) a and b
 - (d) Alimentary canal
4. *Giardia lamblia* cyst contains
 - (a) 2 nuclei
 - (b) 4 nuclei
 - (c) 6 nuclei
 - (d) 8 nuclei
5. Erratic parasites those which are
 - (a) Normally free living and may be parasitic
 - (b) Found in unusual hosts
 - (c) Cannot live as a free living in any life stages
 - (d) given hosts but in abnormal situation
6. Asexual cycle in *Plasmodium* sp in human blood includes
 - (a) Ring stage
 - (b) Trophozoite
 - (c) Merozoites
 - (d) All the above
7. Large trophozoite of *Entamoeba histolytica* feeds on
 - (a) RBC and mucosa
 - (b) blood
 - (c) Digested food
 - (d) Mucosa in the colon
8. Bladder worm is the infective stage of
 - (a) *Ancylostoma duodenale*
 - (b) *Diphyllobothrium latum*
 - (c) *Taenia saginata*
 - (d) *Fasciolopsis buski*
9. Habitat of *Entamoeba gingivalis* is
 - (a) Small intestine
 - (b) Large intestine
 - (c) Oral cavity
 - (d) Blood

11. Which of the following protozoans is transmitted primarily by the motile trophozoite form?
- (a) *Balantidium coli* (b) *Entamoeba histolytica*
 (c) *Giardia lamblia* (d) *Trichomonas vaginalis*
12. All the following are intercellular parasites except
- (a) *Plasmodium* (b) *Trichomonas vaginalis*
 (c) *Lieshmania* (d) None of the above
13. The intermediate host of *Fasciola gigantica* is
- (a) Cattle (b) Pigs
 (c) Cyclops (d) Snails
14. In human, malarial parasites multiply by
- (a) Binary fission (b) Budding
 (c) Gametogony (d) Schizogony
14. Auto-infection could be propagated by
- (a) *Ascaris* sp. (b) *Ancylostoma* sp.
 (c) *Taenia saginata* (d) none of the above
15. The vector of Malaria is
- (a) Female mosquito (b) House flies
 (c) Sand fly (d) Tse Tse fly
16. The second intermediate host of *Diphyllbothrium latum* is
- (a) Snails (b) Fish
 (c) Frogs (d) Cyclops
17. *Taenia saginata* is the cestode parasites, to complete its life cycle requires
- (a) Three host (b) Four hosts
 (c) Five hosts (d) Two hosts
18. The ootype in trematoda connect with
- (a) Oviduct (b) Vitelline canal
 (c) Uterus (d) all of the above
19. Consumption of uncooked fish is likely to cause which of the following helminthic disease
- (a) *Diphyllbothrium latum* (b) *Taenia saginate*
 (c) *Fasciola hepatica* (d) *Echinococcus granulosus*
20. The infective stage of *Plasmodium falciparum* is
- (a) Oocyst (b) Sporozoite
 (c) Bradyzoite (d) Tachzoite

21. Which of the following is not a cestode

- (a) *Diphyllobothrium latum*
- (b) *Echinococcus granulosus*
- (c) *Taenia solium*
- (d) *Schistosoma haematobium*

22. Digestive tract is completely absent in

- (a) Trematodes
- (b) Cestodes
- (c) Nematodes
- (d) All of the above

23. Nematodes are differentiated from other worms by the following except

- (a) Absent fragmentation
- (b) Flat or fleshy leaf-like worm
- (c) Separate sexes
- (d) cylindrical body

26. Which of the following statement is true in respect to trematodes

- (a) Dorso-ventrally flattened
- (b) Intermediate host is mostly snail
- (c) Hermaphrodite except Schistosomes
- (d) All of the above

27. All the following lead to bloody diarrhea except

- (a) *Schistosoma mansoni*
- (b) *Entamoeba histolytica*
- (c) *Schistosoma haematobium*
- (d) *Trypanosoma* spp.

28. The definite host in *Trypanosoma* is

- (a) Insect
- (b) Human
- (c) Lice
- (d) winged bug

29. The diagnostic stage of *Taenia* spp. is

- (a) Blood in urine
- (b) Egg in feces
- (c) Egg in urine
- (d) Cercariae in water

30. The infective stage of *Acanthamoeba* spp. is

- (a) Trophozoite
- (b) Cyst
- (c) a and b
- (d) Sporozoite

B- Mention which (True) or (False) of the following sentences (2 marks/each)

- 31. Infective stage of *Ascaris* sp is cysticercoid larvae ()
- 32. Oocyst is the zygote after the formation of the cyst wall ()
- 33. Metacercariae are encysted cercariae without tails ()
- 34. All cercariae may have both penetration and cystogenous glands ()
- 35. Zoonoses, are the diseases transmissible between animals ()
- 36. Parasites is an organism which live at the expense of another ()
- 37. *Balantidium coli* can reproduce asexual by budding ()
- 38. *Fasciola* spp. and *Clonorchis* spp. are liver flukes ()
- 39. Human, cats, and dogs are definitive hosts of *Heterophyes heterophyes* ()

40. Diagnostic stage of *Fasciola gigantica* is eggs in feces ()

Section II: Midterm+Oral+activity

(Total 30 marks)

A- Mention which (True) or (False) of the following sentences (2 marks/each)

41. Facultative parasites, those cannot lives as a free living ()
42. Redia stage is larval stage in *Schistosoma* sp ()
43. Definitive host, in which adult parasite complete their final stages and development ()
44. *Taenia saginata* differs from *Taenia solium* in the shape of gravid proglottid ()
45. The infective stage of *Ancylostoma duodenale* is filariform larva ()
46. *Enterobius vermicularis* lays eggs containing larvae ()
47. The diagnostic stage of *Ascaris lumbricoides* is larva in sputum ()
48. Intermediate host of *Taenia saginata* is cattle ()
49. Cattle infects with liver flukes by consumption of metacercaria with food ()
50. Costa is a cytoplasmic structure seen at the base of undulating membrane of intestinal flagellates ()

B- Choose the correct answer for each of the following (one mark/ each)

51. The infective stage of *Ascaris lumbricoides* is
- (a) 1st larval stage (b) 2nd larval stage
- (c) 3rd larval stage (d) Egg
52. Which one of the parasites can be transmitted through contaminated food?
- (a) *Enterobius vermicularis* (b) *Taenia solium*
- (c) *Schistosoma mansoni* (d) *Diphyllobothrium latum*
53. The crithidial form in *Trypanosoma* spp. have
- (a) Undulating membrane (b) Penetrating glands
- (c) Two nucleus (d) Lateral Spine
54. Which one of parasites not feed on blood?
- (a) *Schistosoma mansoni* (b) *Entamoeba coli*
- (c) *Fasciola gigantica* (d) *Entamoeba histolytica*
55. Adhering organs in cestodes are
- (a) Suckers (b) Hooks
- (c) Bothria (d) All the above
56. In definite host, *Balantidium coli* habits in
- (a) Small intestine (b) Blood
- (c) Liver (d) Large intestine

57. The infective stage of *Trypanosoma gambiense* is

(a) Epimastigotes

(c) Promastigotes

(b) Crithidia

(d) Metacyclic trypanosome

58. The common name of *Ascaris lumbricoides* is

(a) Roundworm

(c) Threadworm

(b) Hookworm

(d) Fluke worm

59. Which of the following is not a flagellate?

(a) *Lieshmania*

(c) *Trichomonas*

(b) *Giardia*

(d) *Plasmodium*

60. *Entamoeba histolytica* trophozoites multiply by

(a) Binary fission

(c) Schizogony

(b) Gametogony

(d) All of the above

Good luck.....

**Prof. Dr. Gamal H. Abed
Dr. Sara S. Abdel-Hakeem**



امتحان طلاب المستوى الثالث (كيمياء و جيولوجيا)
مقرر (٣٤٥ ج) مبادئ الجيولوجيا التركيبية

الزمن : ٢ ساعة

٢٧ - يونيو ٢٠٢١ م

PRINCIPALS OF STRUCTURAL GEOLOGY (Total Marks 80)

PART I (FINAL EXAM)

(Total Marks 50)

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

Each question has **ONLY** one correct answer.

(Two mark for each question)

ANSWER THE FOLLOWING QUESTIONS:

I. Choose the correct answer for the following statements

1. An unconformity is a buried.

- a. fault or fracture with older rocks above and younger rocks below
- b. surface of erosion separating younger strata above from older strata below
- c. surface of erosion with older strata above and younger strata below

2. The hardest type of unconformity to recognize in the field is

- a. Angular unconformity
- b. Disconformity
- c. Paraconformity

3. The dip which involves tectonic forces is

- a. Primary dip
- b. Secondary dip
- c. Local and Regional dip

4. An unconformity is

- a. a sedimentary unit.
- b. a period of deposition.
- c. a buried erosional surface.

5. The angle at which a sedimentary bed is inclined from the horizontal is called the

- a. Strike
- b. Syncline
- c. dip

6. The compass direction of a line formed by the intersection of an inclined plane and a horizontal plane is called:

- a. the intersection angle
- b. strike
- c. dip.

7. The two sides of a fold are called its

- a. Anticlines
- b. Limbs
- c. axial planes

8. The difference between a joint and a fault is

- a. the fault is larger.
- b. the fault is a long, far-ranging fracture, and a joint is short.
- c. relative movement has occurred on either side of a fault.

9. Stress is

- a. External force
- b. Internal resistive force
- c. Axial force

10. The ability of the material to deform without breaking is called
 - a. Elasticity
 - b. Plasticity
 - c. Creep
11. The limit beyond which the material does not behave elastically is known as
 - a. Proportional limit
 - b. Elastic limit
 - c. Plastic limit
12. Rock units recover their original shape after the stress is released in folding.
 - a. Fracture strain.
 - b. Plastic strain.
 - c. Elastic strain.
13. When the rocks cool, they contract, and the hexagonal shape is a result of this contraction
 - a. Mud cracks.
 - b. Columnar joints.
 - c. Dykes
14. Laccoliths is a primary structure of which type of rock?
 - a. Igneous rock
 - b. Sedimentary rock
 - c. Metamorphic rock
15. Cross bedding is a primary structure of which type of rock?
 - a. Igneous rock
 - b. Sedimentary rock
 - c. Metamorphic rock
16. A surface of erosion or nondeposition between younger and older beds that are parallel with one another is known as
 - a. Unconformity.
 - b. Non-conformity.
 - c. Disconformity.
17. Stratification can be seen widely in which of the following rocks?
 - a. Igneous rocks
 - b. Metamorphic rocks
 - c. Sedimentary rocks
18. An igneous intrusion that cuts across rock layers is called a
 - a. Dike.
 - b. Sill.
 - c. Batholith.
19. In a syncline, the oldest rocks will be found
 - a. on the limbs of the fold.
 - b. near the axis of the fold.
 - c. at the bottom of the fold
20. Which type of fault would probably occur from a compressional stress?
 - a. normal
 - b. reverse
 - c. anticline

II- True or False? (Circle the correct answer). (Each 2 Marks)

21. Topography has no influence on the pattern of vertical beds. True or False?
22. The out crop pattern of vertical bed forms straight lines. True or False?
23. Vertical faults have neither a footwall nor a hanging wall. True or False?
24. Vertical faults have a footwall in downthrow side and hanging wall in upthrow side. True or False?

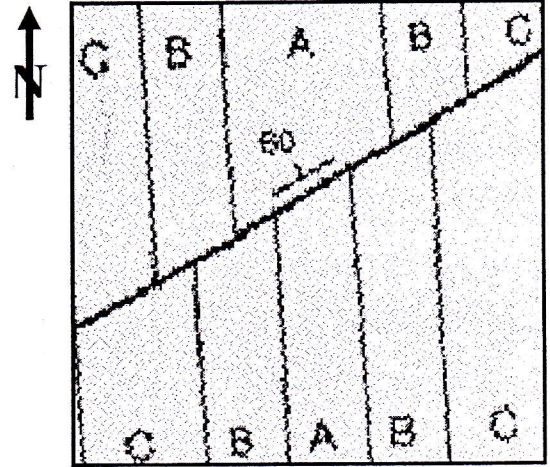
- b. The straight lines formed by outcrop pattern of vertical beds are parallel to the strike of the beds.
True or False?

PART II (OTHER EXAMS) (30 Marks)

(Activity, Midterm and Oral)

(Three marks for each question)

In the geologic map below, units A, B, and C are sedimentary rocks; unit A is the oldest and unit C is the youngest. The sedimentary rocks are cut by a fault, indicated by the dark line, which dips 60 degrees to the northwest (26, 27, 28, and 29).



26. What type of structure is shown on the map?
- a faulted anticline
 - a folded strike-slip fault
 - a faulted syncline
27. The down throw side of the fault is
- toward the North
 - toward the center of the map
 - toward the South
28. What type of fault is depicted on the geologic map?
- a normal fault
 - a reverse fault
 - a right-lateral fault
29. Which way do the sedimentary layers dip – assuming the structure is not overturned?
- toward the west
 - toward the center of the map
 - east and west
30. Which of the following is not a basic type of strain?
- Compressive strain
 - Area strain
 - Volume strain
31. The deformation per unit length is called
- Strain
 - Stress
 - Elasticity
32. Which features are characteristic of anticlines?
- Dip symbols pointing away from axis and oldest rock in the middle.
 - Dip symbols pointing away from axis and youngest rock in the middle.
 - Dip symbols pointing toward axis and oldest rock in the middle.
33. In what type of fault does the hanging wall move down relative to the foot wall?
- Normal fault.
 - Reverse fault.
 - Strike-slip fault.
34. What name is given to a block that has been down-dropped by normal faulting?
- Graben.
 - Horst.
 - Joint.
35. Rock units recover their original shape after the stress is released in folding.
- Fracture strain.
 - Plastic strain.
 - Elastic strain.

GOOD LUCK

Geology Department Faculty of Science Assiut University		Time: 3 H July-2021 324 G (Principles of Petrology)
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Part I: Final Term Exam (50 Marks)

Q1: Shades (T) for the true statements or (F) for the false statements

1. Geothermal gradient is the change in temperature with depths in the earth.
2. Porphyritic textures are composed of two or more distinct size populations of minerals resulting from complex history of cooling.
3. Radiation, conduction and convection are the main processes of heat transfer in the earth.
4. Phaneritic is the crystals that can see by eye.
5. Texture with no crystals formed is named phanitic texture
6. Quartz, feldspar and feldspathoids are the main mineral composition used in the classification of acidic and intermediate igneous rocks.
7. Magma with SiO₂ less than 66 % are felsic magma.
8. Plagioclase, olivine and pyroxene minerals are the main mineral used in the nomenclatures of intermediate igneous rocks.
9. Size, shape and arrangement of the mineral constituents are known as rock texture.
10. In igneous rocks, the cooling rate of magma is the main factor that controlling the grain size of mineral crystals.
11. Compositional zoning is formed when a mineral changes composition as it grows during cooling.
12. Idiomorphic is means that all mineral crystals are euhedral.
13. Poikilitic texture is formed when phenocrysts of mineral included abundant smaller mineral inclusions.
14. Corona texture is resulting from the settling of early – formed magmatic during fractional crystallization.
15. Graphic texture is a single crystal of cuneiform quartz intergrown with alkali feldspar.
16. Granite and gabbro are examples of plutonic igneous rocks.
17. Basaltic magma is higher in temperature than acidic and andesitic magma.
18. Igneous rocks that are formed when magma cools down and hardens before it reach the surface of the earth volcanic or extrusive.
19. Textures that formed due to alterations that take place after the rock is completely solid are secondary texture.
20. Texture formed of a single pyroxene crystal envelops several well-developed plagioclase laths is named ophitic texture.
21. Acidic magma has lower viscosity than basaltic magma.

22. Metamorphism is the process of mineralogical and structural changes of rocks in their solid state in response to physical and chemical conditions (pressure, temperature and chemistry).
23. Metamorphic petrology is dresses the processes that produce melts (magma), how those melts then rised, the chemical and mineralogical evolution as they cool and crystallize, and the eventual eruption of emplacement of the resulting rocks.
24. High temperature low Pressure metamorphism occurs near intrusive igneous bodies is referred to as dynamic metamorphism.
25. A very large-scale phenomenon that occurs at depth owing to the regional thermal gradient is regional metamorphism.
26. Schist and gneiss rocks are formed via regional metamorphism.
27. Foliation is the texture developed when planar minerals e.g. mica flakes show orientation parallel to each other.
28. Marble is a metamorphosed limestone rocks.
29. Hornfels rocks are resulted from contact metamorphism
30. Temperature, pressure and hydrothermal solutions are the main agents of metamorphism.
31. Oligomictic conglomerates are composed of clasts include several different rock types.
32. Sphericity is a description of how angular the edges of a particle are.
33. Permeability refers to the volume of void space (available to contain fluid or air) in a sediment or sedimentary rock.
34. Major categories of carbonate rocks are limestone, dolomite, chert and phosphate rocks.
35. Porosity that develops after deposition is termed secondary porosity.
36. Fabric is the overall appearance of a particle.
37. Nonclastic sedimentary rocks are generated by explosive igneous activity, meteoritics and cataclastics.
38. Beaches tend to have sands that are better sorted and with more common coarse tail skewness than river sands.
39. Glacial till that is transported within glacial ice is typically rounded in shape.
40. In general, the better sorted the sediment the greater the porosity.
41. Eolian sands commonly have a higher sphericity than water transported sand.
42. Most common cements in sedimentary rocks are calcite and quartz.
43. Extraformational Conglomerates are normally very well rounded and well sorted (Clasts derived from a distant source).
44. Sandstones are major reservoirs of groundwater and petroleum.
45. Layers of Mg-O/OH in a clay mineral are referred to as gibbsite layers.
46. Gypsum is the main mineral constituent of the carbonate minerals.
47. Calcite cements precipitate from acid solutions at $\text{pH} < 7$.
48. Quartzwackes are rich in matrix more than 15%.

49. Potassium feldspars are more abundance in sedimentary rocks than plagioclase because they are more common in continental crust and resist decomposition better.
50. Lithic fragments provide the most specific information about sandstone provenance.

Part II: Midterm, Oral, and activity (30 Marks)

Q2: Shades the correct answer A, B, C, D: (One mark each)

51. Change of temperature with depth in the earth is defined
(A) pressure change (B) geothermal gradients (C) density change
(D) geothermometry
52. Granite is intrusive igneous rocks with chemical composition
(A) intermediate (B) basic (C) acidic (D) ultrabasic
53. Texture developed when planar minerals e.g. mica flakes show orientation parallel to each other in metamorphic rocks is
(A) foliated (B) nonfoliated (C) hornfelsic (D) massive.
54. In igneous texture, crystals too small to see by eye is
(A) phaneritic (B) phanitic (C) glassy (D) directive
55. Marble rock is an example of
(A) contact metamorphism (B) regional metamorphism (C)
dynamic metamorphism (D) dynamo-thermal metamorphism
56. Gabbro is an intrusive igneous rocks with composition
(A) basic (B) intermediate (C) acidic (D) ultrabasic.
57. Rocks composed mainly of euhedral mineral crystals is named as
(A) hypidiomorphic (B) allotriomorphic (C) idiomorphic (D) anhedral
58. Texture resulting from the reaction rims or overgrowth that surrounded phenocrysts is named
(A) ophitic (B) corona (C) graphic (D) porphyritic.
59. Texture composed of phenocrysts surrounded by glassy groundmass is named:
(A) porphyritic (B) vitrophyric (C) ophitic) (D) corona.
60. Texture of a single crystal of cuneiform quartz intergrowth with alkali feldspar is known as
(A) graphic (B) porphyritic (C) cumulate.
61. When a phenocrysts of mineral included abundant smaller mineral inclusions the texture formed is
(A) corona (B) graphic (C) poikilitic (D) porphyritic.
62. Rhyolite rock is an example of
(A) volcanic acidic (B) plutonic acidic (C) volcanic basic (D) plutonic acidic.
63. Igneous rocks contain < 45 % silica are known as
(A) acidic (B) ultrabasic (C) basic (D) intermediate.
64. Small (< 20 m wide) shallow intrusions that show a discordant relationship to the rocks in which they intrude is called

- (A) dyke (B) sill (C) pluton (D) batholith
65. Texture that formed of exsolution lamellae of albite occurring in orthoclase or microcline is named
(A) graphic (B) ophitic (C) perthitic (D) porphyritic.
66. Igneous rocks with $\text{SiO}_2 > 66 \text{ wt.}\%$ are named
(A) acidic (B) basic (C) ultrabasic (D) intermediate
67. Igneous rocks with $\text{SiO}_2 66 - 52 \text{ wt.}\%$ are named
(A) acidic (B) basic (C) ultrabasic (D) intermediate
68. Igneous rocks with $\text{SiO}_2 52-45 \text{ wt.}\%$ are named
(A) acidic (B) basic (C) ultrabasic (D) intermediate
69. Igneous rocks with $\text{SiO}_2 < 45 \text{ wt.}\%$ are named
(A) acidic (B) basic (C) ultrabasic (D) intermediate
70. The main minerals used in the nomenclature of acidic plutonic igneous rocks are:
(A) quartz (B) alkali feldspar (C) plagioclase (D) all of these
71. The principal purely chemical sedimentary rock type is.....
(A) sandstone (B) evaporite (C) shale (D) conglomerate
72. The group of properties that describe the individual and bulk characteristics of the particles making up a sediment refers to
(A) the texture of a sediment
(B) the composition of a sediment
(C) the fabric of a sediment
(D) the form of a sediment
73. is related to how easily a fluid will pass through any granular material
(A) Sphericity (B) Porosity (C) Permeability (D) Roundness
74. reflects a lack of transport by water prior to deposition.
(A) Angularity (B) Porosity (C) Roundness (D) Maturity
75. Precipitation of new minerals from pore waters causes of the grains and acts to fill the pore spaces, reducing porosity.
(A) dissolution (B) cementation (C) bioturbation (D) fracturing
76. is the most effective means of creating secondary porosity.
(A) Solution (B) Compaction (C) Cementation (D) Silicification
77. sedimentary rocks are composed of clasts of pre-existing rocks and minerals.
(A) Terrigenous clastic (B) Organic (C) Chemical (D) Non-clastic
78. Breccia is composed of fragments indicating that they did not travel far from their source.
(A) rounded (B) subrounded (C) well rounded (D) angular
79. is unstable mineral at surface temperatures and pressures.
(A) Calcite (B) Quartz (C) Aragonite (D) dolomite
80. are rich in quartz than feldspar.
(A) Quartz arenites (B) Feldspathic arenites (C) Lithic arenites
(D) Greywackes

انتهت الأسئلة وبالتوفيق

أ.د. محمد عبد المنعم محمد

أ.د. محمود أحمد عيسى

Special Course 305G (Ophiolite)

Answer only THREE questions from the following. (Use drawings when possible)

- 1- Summarize the sequential events occurring in an arc-continent collision.**
- 2- Define the term marginal sea and explain the different models given for the formation of the majority of marginal seas.**
- 3- Mention briefly the common characteristics of the rifts.**
- 4- Compare between the sequential events associated with evolution of plate margins and aulacogens.**

Good luck


Prof. Dr. \ Ali A. Khudeir

Geology Department Faculty of Science Assiut University		قسم الجيولوجيا كلية العلوم جامعة أسيوط
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Second Semester Final Examination
Geology Students, 2nd Level
(Vertebrate Paleontology and Origin of Species)

July 2021	G 216	80 Marks	Time: 2 hours
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PART ONE (FINAL EXAM 50 DEGREES)

First Question (30 degrees)

Choose the correct answer (2 degrees each)

1. *Basilosaurus* is belonging to.....
a. Mammals b. Fish c. Reptiles d. Amphibians
2. The description of mammal-like reptiles usually describes.....
a. Anapsids b. Synapsids c. Diapsids d. All of them
3. *Bahariasaurus ingens* is one of the Egyptian dinosaurs of the..... age
a. Maastrichtian b. Campanian c. Cenomanian d. Santonian
4. *Ichthyornithiformes* is belonging to.....Birds.
a. Paleocene b. Triassic c. Miocene d. Cretaceous
5. Order *Anthracosauria* is known as.....
a. Lizards b. Frogs c. Marine reptiles d. Birds
6. *Dorudon* is belonging to
a. Reptiles b. Fish c. Mammals d. Amphibians
7. Amphibians are firstly evolved during.....
a. Devonian b. Carboniferous c. Triassic d. Permian
8. *Moas* is belonging to.....Birds
a. Paleocene b. Triassic c. Miocene d. Pleistocene
9. The oldest known bird fossil is.....
a. *Archaeopteryx* b. *Enantiornithes* c. *Gastornis* d. *Phororacids*
10. Fish that have paired pelvic fins known as.....
a. Osteichthyes b. Acanthodians c. Chondrichthyes d. Placodermi
11. *Ichthyosaurs* is.....
a. Amphibian b. Land Mammal c. Marine Reptile d. Birds
12. *Ostracoderms* is used as an informal term for the armored.....jawless fishes
a. Mesozoic b. Cenozoic c. Paleozoic d. Per-Cambrian
13. The term "Opposite Birds" used to describe.....
a. *Moas* b. *Brachiosaurus* c. *Enantiornithes* d. *Pterosaurs*
14. What was the 1st group of fish to evolve?
a. Bony fish b. Jawless fish c. Cartilage fish d. Goldfish
15.was the accepted ancestor for the Amphibians
a. Lobe fishes b. Ray-finned fishes c. Lampreys d. Mammals

Second Question (20 degrees)

State whether the following statements are correct or wrong (2 degrees each)

- 16- Development of a new species by anagenesis means growing of new species from a parent species that still exists..... ()
- 17- Ecological isolation means that two species live in different habitats have a good chance of interaction..... ()
- 18- Biological species concept defines a species as a set of organisms with a unique genetic history..... ()
- 19- Interactions with other organisms may drive a species to extinction..... ()
- 20- Hybrid sterility means that two species can mate but produce a sterile healthy offspring..... ()
- 21- Life is, to the best of our knowledge to date, unique to our planet Earth and other planets in the solar system..... ()
- 22- Species is a group of interbreeding population, whose members have the potential to interbreed in nature and produce viable, fertile offspring..... ()
- 23- Natural events, of geological or extraterrestrial origin, can cause sudden, and extremely catastrophic, extinctions on a large, or even global, basis..... ()
- 24- Life originated from abiotic material, since organic compounds are composed of the same chemical elements of the non-organic world..... ()
- 25- Prokaryotes represent the oldest form of life that lived 3-4 billion years ago..... ()

PART TWO: MID-TERM+ORAL+ACTIVITY (30 DEGREES)

Put true (v) or false (x) in the front of the following sentences (two degrees for each)

- 26- *Elephant Bird* is one of the most important flight Pleistocene Birds..... ()
- 27- Pterosaurs existed from the late Triassic to the end of the Cretaceous..... ()
- 28- The limbs of the earliest Tetrapods first evolved for walking on land..... ()
- 29- Acanthodians jaws fish ranged from Silurian to Permian Period..... ()
- 30- Anapsid is an ancestor of the first turtles, which appeared in the Triassic.... ()
- 31- The adult forms of Urochordata are mobile and feed via pharyngeal slits.... ()
- 32- The cephalaspids are advanced than heterostracans in the presence of lateral stabilizers..... ()
- 33- *Acanthostega* and *Ichthyostega* are characterized by occurrence of digits as well as *Tiktaalik roseae*..... ()
- 34- Reptiles are classified on the basis of the number of openings in their skull ()
- 35- Birds are evolved from Theropod dinosaurs in the Triassic period..... ()
- 36- Galeaspids are having the largest number of gills among the jawed fish..... ()
- 37- Phororacids consider one of the Paleogene Bipedal Carnivores..... ()
- 38- Anapsid is first appeared in late Carboniferous..... ()
- 39- The Heterostraci is an armored jawless vertebrate, which lived from the Early Silurian to the Late Devonian..... ()
- 40- Labyrinthodontia considered the first vertebrates lived on solid ground..... ()

Good luck...

Assiut University
Faculty of science
Geology Department

Date: June, 2021
Time allowed: 2 hours

Second semester final exam in metamorphic rocks (G336)

Students: 3rd year geology

Choose the correct answer A, B, C or D (one mark each):

(50 Marks)

1. This mineral is found only in metamorphic rocks

A-garnet B-pyroxene C- calcite D- plagioclase

2. Hornfelses are formed in area intruded by

A-basaltic magma B- granitic magma
C-syenitic magma D- kimberlitic magma)

3. Contact metamorphic aureoles are best observed in ——— grade metamorphic rocks

A-medium B-low C-very low D- high

4. At distance $\frac{1}{2}D$ of basic intrusion, the temperature attends to

A- $410+T_c$ B- $420+T_c$ C- $430+T_c$ D- $450+T_c$

5. The mineral assemblage characterized the very low grade

A-lawsonite – glaucophane B- pumpellyite - prehnite
C- zoisite – actinolite D- staurolite – biotite – almandine

6. Which type of metamorphism accompanied by addition or subtraction of some elements?

A-thermal metamorphism B-metasomatic metamorphism
C-regional metamorphism D-dynamic metamorphism)

7. Which one of these minerals is a stress mineral?

A-garnet B- cordierite C- muscovite D- andalusite

8. Sanidinite rocks can be formed by ——— metamorphism

A-regional B- thermal C- dynamic D- metasomatic

9. The metamorphic process happened at ——— depth
A-10-30km B- 35-40km C- 50-60km D- 40-50km
10. The sources of heat that necessary to metamorphism are
A-igneous intrusions B- depths C- decay of radioactive minerals D- all of these
11. Silica phases may be found in
A-greenschist facies B - sanidinite facies C- eclogite facies D- amphibolite facies
12. In which grade the pumpellyite is present?
A-low grade B- medium grade C-high grade D- very low grade
13. Possible temperature attained at contact of basic intrusion {1000m thickness}
A-725+Tc B-720+Tc C- 730+Tc D- 740+Tc
14. Match this mineral assemblage with rock name pyroxene – garnet
A-marble B- amphibolites C- granulite D- eclogite
15. Factors govern the width of contact metamorphic aureole at particular level of erosion
A-temperature of intrusion B- thickness of intrusion
C-type of lithology D-all of these
16. Type of metamorphism that can cause the formation of porphyroclastic texture
A-dynamic B-regional C- thermal D- metasomatic metamorphism
17. Which of these rocks characterized by decussate texture?
A-phyllite B-mylonite C- marble D- Amphibolite
18. The original lithology that can cause the formation of mesh texture
A-sandstone B- dunite C- shale D- diorite
19. Which of the following statements about metamorphism of a shale is false?
A-with increasing metamorphism, the clay minerals breakdown to form micas
B-with increasing metamorphism, the grain size of the minerals gets smaller
C-with increasing metamorphism, foliation develops
D-with increasing metamorphism, the amount of water decreases

20. In regional metamorphism the source of increased temperature and pressure is
- A- local intrusive heat source
 - B- impact metamorphism
 - C- the increase in temperature with increasing depth of burial
 - D- due to increased rate of radioactive decay)
21. A combination of shallow earthquakes, tension, and contact metamorphism characterizes:-
- A-transform fault margins
 - B-spreading centers
 - C- continent/continent margins
 - D- subduction type margins
22. Within a 50 mile traverse you walk from shale into slate into phyllite. You are walking in the direction of
- A-increasing metamorphic grade
 - B- decreasing metamorphic grade
 - C- increasing degree of contact metamorphism
 - D- increasing degree of cataclastic metamorphism
23. Which type of pressure will result in the alignment of metamorphic minerals?
- A-contact
 - B- directed
 - C- confining
 - D- chemical pressure
24. What type of metamorphism is caused by high temperature and high pressure imposed over a large volume of crust?
- A-burial
 - B- contact
 - C- regional
 - D-cataclastic
25. A rock that has undergone cataclastic metamorphism would most likely display which of the following?
- A- preserved sedimentary layering
 - B- pulverized rock fragments
 - C- new minerals
 - D- large olivine crystals
26. What is the most prominent textural feature of regional metamorphic rocks?
- A-foliation
 - B- bedding
 - C- cataclasis
 - D-ripples
27. Which mineral is responsible for the strong foliation in schist?
- A-quartz
 - B- calcite
 - C- mica
 - D- foliate

28. Which of the following metamorphic rocks is not paired with its true parent rock

A-greenstone-basalt B-quartzite - quartz arenite

C- schist – shale D- hornfels – dolomite

29. What is the pressure on a rock at 10 kilometers depth?

A- 1 kb B - 1.5 kb C- 2 kb D- 2.5 kb

30. Is the process where rocks previously metamorphosed under high-grade conditions are later metamorphosed under low-grade conditions?

A-metasomatism B- cataclasis C-foliation D- retrograde metamorphism

31. Hydrothermal metamorphism is very common in which of the following settings?

A-at continental collision zones B- along shallow faults

C- at mid-ocean ridges D - in mid-continental regions

32. Metamorphism occurs:

A-adjacent to igneous intrusions B- along faults

C- in subduction zones D- in all of these settings

33. In which of the following metamorphic environments would you expect to find bedding and other sedimentary structures to be preserved?

A-burial metamorphism B - along faults

C- contact metamorphism D- regional metamorphism

34. The parallel alignment of mica in a metamorphic rock is an example of

A-porphyroblasts B- bedding C- metasomatism D- foliation

35. Which of the following sets is arranged in order of increasing metamorphic grade?

A-shale - slate – phyllite B- phyllite - gneiss – schist

C- phyllite - slate – schist D-schist - shale – gneiss)

36. Which of the following rocks represent the highest metamorphic grade?

A-slate B- schist C-phyllite D-gneiss

37. Metamorphic rocks with segregated light and dark minerals are called

A-slate B-schist C- phyllite D- gneiss

38. During thermal metamorphism a quartz arenite will change into what type of rock?

- A-slate B-schist C-quartzite D-gneiss

39. Which of the following metamorphic rocks forms in the forearc of a subduction zone?

- A-Amphibolite B-blueschist C-quartzite D-gneiss

40. Which of the following rocks can be considered gradational between igneous rocks and metamorphic rocks?

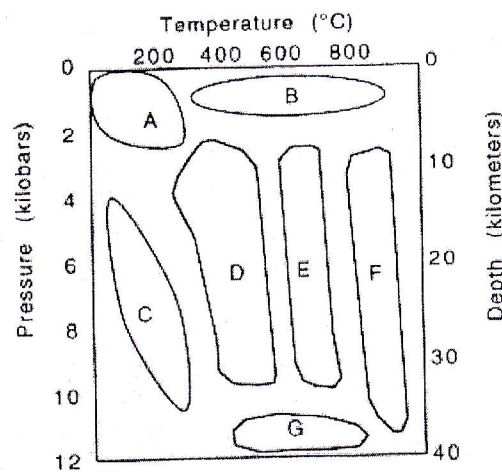
- A-gneisses B-quartzite C-migmatite D-schist

41. A rock rich in garnet and pyroxene that forms at extremely high pressures and moderate to high temperatures is called an

- A-amphibolite B-hornfels C-granulite D-eclogite

42. What is sedimentary rock changed into slate during metamorphism?

- A-shale B-limestone C-sandstone D-breccia



43. In this figure the zeolite facies occur in which pressure-temperature regime?

- A-area A B-area B C-area C D-area D

44. The amphibolite facies occurs in which pressure-temperature regime?

- A-area C B-area D C-area E D-area F

45. Which of the following metamorphic rocks cannot form from shale?
A-schist B- marble C- hornfels D- slate
46. The important change in rocks during the metamorphic process
A-mineral composition B- texture C- crystal form D- all of these
47. Which of these rocks characterized by mosaic texture?
A-schist B- slate C- marble D- serpentine
48. The expected metamorphic grade at the contact of deep sea basic intrusion
A-low B- medium C- high D- very low grade
49. During metamorphism, changes in the bulk composition of a rock occur primarily as a result of:
A- increases in pressure B- increases in temperature
C- reaction with hydrothermal fluids D- all of these
50. Which of the following processes will cause metamorphism?
A-a change in the chemical environment B- an increase in temperature
C - an increase in pressure D- all of these

أسئلة أعمال السنة والشفوي والنشاط

Choose the correct answer A, B, C or D (one mark each):

(30 Marks)

51. The most common foliated texture is
A- porphyroplastic texture B- mosaic texture
C- decussate texture D- gneissose texture
52. The original rocks that can cause the formation of amphibolite
A-mudstone B- granite C- limestone D- basalt
53. Which of the following index minerals forms at the highest metamorphic grade?
A-chlorite B- silimanite C- biotite D- garnet
54. Which of the following metamorphic rocks is characterized by mesh texture?
A-serpentinite B-schist C- gneiss D-phyllonite
55. The more common metamorphic mineral in low grade schist are
A-albite B-chlorite C-biotite D- All of these
56. Granulite facies is well developed in:
A-Precambrian terrains B-subduction zone
C-transform fault D-divergence zone
57. The metamorphic rocks usually present in nature associated with
A-Ancient igneous rocks B-Cretaceous sedimentary rocks
C- Tertiary sedimentary rocks D-Recent sedimentary rocks
58. Andradite present in:
A- thermally metamorphosed calcareous sediment
B- dynamic metamorphic sediments
C- regionally metamorphic sediments
D- metasomatic calcareous sediment
59. Quartzite can be formed by:
A-regional B- dynamic C- thermal D-metasomatic metamorphism

60. Talc-carbonate rocks are product of:
 A-regioanl B-thermal C-dynamic D-metasomatic metamorphism
61. The more common metamorphic rocks in nature are:
 A-schists B-serpentinities C-marbles D-quartzizites
62. In hydrothermal metamorphism the most important factors of metamorphism is the:
 A-hot ion rich fluids B-temperature C-directive pressure D-indirective pressure
63. What sedimentary rock is metamorphed to hornfelse during thermal metamorphism
 A-mudstone B-sandstone C-limestone D-arenite
64. The index metamorphic mineral need:
 A-specific lithology B- specific type of metamorphism
 C- specific degree of metamorphism D- All of these
65. Phyllite is developed in higher degree of metamorphism than:
 A-geniss B-schist C-slate D-migmatite
66. Mylonite can perform from:
 A-basalt B-granite C-syenite D-All of these
67. Pressure plays a role in the formation of:
 A-schist B-marble C-quartzizite D-mylonite
68. Metamorphic rocks could be containing:
 A-fossils B-specific mineral C-specific texture D-All of these
69. Amphibolites facies is named after index mineral:
 A-hornblenbe B-hypersthene C-andalusite D-forsterite
70. Blueschist facie is named after tectonic setting:
 A-transform fault B-subduction zone
 C-Sea floor spreading zone D- continent collision
71. In which grade k-feldspar and muscovite are present?
 A-very low B-medium C-high D-low grade

72. Possible temperature at distance $1/10 D$ of basic intrusion is
 A- $600+T_c$ B- $610+T_c$ C- $620+T_c$ D- $625+T_c$
73. At shallow granitic intrusion the grade of metamorphism in surrounding rocks are:
 A-high B-very low C-medium to low D-low
74. Type of metamorphism that can cause the formation of porphyroclastic texture:
 A-dynamic B-regional C-thermal D-metasomatic metamorphism
75. Which of these rocks are characterized by decussate texture?
 A-phyllite B-mylonite C-marble D-amphibolite
76. Which of these rocks are characterized by augen texture?
 A-gneiss B-slate C-marble D-serpentine
77. The expected metamorphic grade at the contact of deep seated granitic intrusion
 A-low B-medium C-high D-very low
78. The original rocks that can cause the formation of hornblende:
 A-mudstone B-granite C-limestone D-basalt
79. Mylonitic rocks are products of:
 A-regional B-thermal C-dynamic D-metasomatic metamorphism
80. High grade metamorphic rocks present in the area around:
 A-gabbroic B-syenitic C-dioritic D-granitic intrusions

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