Geology Department Faculty of Science Assiut University		قسم الجيولوجيا كلية العلوم جامعة أسيوط

Second Semester Final Examination
Geology Students, 2nd Level
(Vertebrate Paleontology and Origin of Species)

June 2022	G 216	50 Marks	Time: 2 hours

Part 1: Vertebrate Paleontology (30 degree)

Q1: Choose the correct answer (1 degree each)

1. The primitive jawless fish that considers the earliest vertebrates is termed.....

a. Cephalaspidomorph b. Placoderms c. Ostracoderms d. Chondrichthyes

2. *Tiktaalik* is an important fossil link in the origin of.....

a. Fishes b. Reptelis c. Tetrapods d. Chondrichthyes

3. The oldest Reptiles in the fossil record are known from ..... age

a. Ordovician b. Late Triassic c. Early Cretaceous d. Late Carboniferous

4. Galeaspids among the fish that have the largest number of.....

a. Fins b. Gills c. Scales d. Bony plates

5. Labyrinthodonts start to decline throughout the .....

a. Cambrian b. Eocene c. Permian d. Silurian

6. Intermediate group between the bacteria and eukaryotes is termed as.....

a. Cyanobacteria b. Archaebacteria c. Blue green algae d. Haptophytes

7. .....known as the age of fish

a. Devonian b. Carboniferous c. Permian d. Triassic

8. .....are important group of lobe-finned fish that considered the bridge to amphibians

a. Acanthodians b. Sarcopterygians c. Actinoptergians d. Osteichthyes

9. ..... considers the main Carboniferous tetrapod group.

a. Temnospondyli b. Anthracosauria c. Lissamphibia d. Lepospondyli

10. Amphibians and Reptiles are different sufficiently in.....

a. skull structure b. jawbones c. ear location d. All of them

11. ..... considers among the Pleistocene Flightless Birds.

a. *Phororacids* b. *Elephant Birds* c. *Gastornis* d. All of them

12..... Era known as age of Mammals.

a. Mesozoic b. Paleozoic c. Cenozoic d. Pre-Cambrian

13. Sweat glands are among the main characteristics of.....

a. Mammals b. Reptiles c. Amphibians d. Fishes

14.....is the earliest Diapsid known throughout the geologic record.

a. *Petrolacosauridae* b. *Ophiacodontidae* c. *plesiosaur* d. *Pterosaurs*

15. ..... considers the most popular and vicious of all prehistoric animals.

a. *Triceratops* b. *Tyrannosaurus Rex* c. *Stegosaurus* d. All of them

Q2: State whether the following statements are correct or wrong (1 degree each)

16- Pterosaurs existed from the late Triassic to the end of the Cretaceous Period ( ).

17- The limbs of the earliest Tetrapods first evolved for walking on land ( ).

18- Acanthodians jaws fish ranged from Silurian to Permian Period ( ).

19- Anapsid is an ancestor of the first turtles, which appeared in the Triassic.

20- The adult forms of Subphylum Cephalochordata show chordate features ( ).

21- The presence of the notochord considers one of the main characteristics of vertebrates ( ).

22- The jaws of jaw fish are formed from the modification of the anterior gill arches ( ).

23- Amphibians are aquatic as larvae and terrestrial as adults ( ).

24- The Triassic period saw major diversification of land amphibians ( ).

25- The limbs of the earliest tetrapod first evolved for walking under water ( ).

26. Cartilaginous fish characterized by hard bone skeleton ( ).

27. *Spinosaurus aegyptiacus* dinosaur belongs to the Maastrichtian age ( ).

28. The jawless Acanthodians fish has fins supported by erectable spines ( ).

29. Therapsids constitute the majority of the known reptile genera ( ).

30. *Bahariasaurus ingens* dinosaur belongs to the Cenomanian age ( ).

Part 2: Origin of Species (20 degree)

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

1- Development of a new species by anagenesis means growing of new species from parent species that still exists ( ).

2- Natural events, of geological or extraterrestrial origin, can cause sudden, and extremely catastrophic, extinctions on a large, or even global, basis ( ).

3- Species is a group of interbreeding population, whose members have the potential to interbreed in nature and produce viable, fertile offspring ( ).

4- Dominance indices are heavily weighted towards the commonest species, but it can be used to indicate species diversity ( ).

5- Ecological isolation means that two species live in different habitats have a good chance of interaction ( ).

6- In statistic, population means all individuals of a species interact with one another to maintain a homogenous gee pool ( ).

7- Biological species concept defines a species as a set of organisms with a unique genetic history ( ).

8- Hybrid sterility means that two species can mate but produce a sterile healthy offspring ( ).

9- Biodiversity may be expressed in number of ways for example species richness or by various indices that take into account richness and abundance ( ).

10- Similarities among embryos of different vertebrates point to a common ancestor ( ).

Good Luck,,,

Examiners: Dr. Amr Said Abdel-Rahman Deaf and Dr. Amr Abdel Sabour

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

الامتحان التحريرى النهائى لطلاب المستوى الثانى بقسم الجيولوجيا (جميع الشعب)
المقرر: علم الطبقات (٢١٠ ج)
دور يونيو - العام الجامعى ٢٠٢١-٢٠٢٢م

الدرجة الكلية للأمتحان: ٥٠ درجة — الزمن: ساعتان

ملحوظة هامة: الامتحان يتكون من ثلاث صفحات ويتم تظليل (طمس - تسويد) الاجابة المختارة **بالقلم الجاف فقط** على نموذج الاجابة

QI: Shade (T) for True statements or (F) for False statements

(30 marks; 1mark each)

1- Gradational contacts between sedimentary rock units result from abrupt change of lithology in the depositional basin with time.
2- The lateral continuity of rocks can be seen across valley sides.
3- In the paraconformity type of the unconformity surface can hardly be inferred without the help of fossils.
4- Sea level fluctuations result either from eustatic or non-eustatic causes.
5- The law of superposition can be applied for all rock types that display a layered nature.
6- Extraterrestrial impact events can cause mass extinctions.
7- Cross-bedding is considered one of the cross-cutting agents.
8- Bracketing is a method used to infer relative ages of geologic events.
9- Superposition means that younger rocks are at the base.
10- Stratigraphy is the study and interpretation of layered rock sequences.
11- The principle of faunal successions explains that the strata were being deposited largely in terrestrial environments.
12- Fossils can sometimes form the main rock forming constituents.
13- The quality of core samples is better than that of cuttings because the latter always have contamination from the overlying rock intervals into the underlying ones.
14- Fossil animals and plants form the basis of biostratigraphy.
15- Magnetostratigraphic units are termed "pedostratigraphic units".
16- Angular unconformity is an important tectonic evidence of superposition.
17- Relative age dating means a determination of the absolute ages of rocks.
18- Superposition can be evidenced by stratigraphic or tectonic criteria.
19- Major unconformities are considered non-significant stratigraphic gaps.
20- If a given formation can be divided into members this implies that all underlying and overlying formations must be divided into members.
21- The "Formation" is the largest formal lithostratigraphic unit.
22- In lithostratigraphic correlation age of the compared rock units is required.
23- The Walter's law describes how the different shallow and deep facies accumulate and overlap.
24- The type locality is the geographic location where the stratotype of a rock unit occurs.
25- The time span between the Cambrian and Holocene is divided into three long eras.
26- Mass extinction events, which are observed across stage boundaries, can be caused by worldwide volcanic eruptions.
27- A thin bed like a coal seam can be considered a marker horizon that represents a "geologic instant" in time.

28- Variable types of well logs are important in subsurface stratigraphy and correlation.
29- In biostratigraphy, very common is the appearance of a species that coincides with a change in lithology.
30- Erosion or non-deposition results in gaps in the sediment record.

QII: Shade the correct answer; A, B, C or D (20 marks; 1mark each)

31- Locally, the maximum abundance of a given taxon, or some taxa, in a given sequence can vary with time due to preservation in:
A- the same paleoenvironment B- changing paleoenvironments
C- terrestrial paleoenvironments D- marine paleoenvironments

32- Environments of deposition that accumulate laterally can end up overlapping one another across time due to:
A- sea transgression B- erosion C- sea regression D- A, C

33- The principle of inclusions means that an inclusion are .....
A- younger than their hosting rock B- of the same age as the host rock
C- older than their hosting rock D- always of the same rock type

34- Shales of the Dakhla rock unit in Egypt is preferably named the .....
A- Dakhla Shale B- Dakhla Formation
C- Dakhla Shale Formation D- Dakhla Clastics

35- Biostratigraphy is the study of .....
A- faunal and floral successions
B- taxonomy of fossilized remains of animals and plants
C- spatial and temporal relationships of rocks
D- physical composition of rocks

36- The geological processes currently working today must have worked in the geologic past, this is known as the principle of .....
A- superposition B- original horizontality
C- uniformitarianism D- faunal succession

37- The science of stratigraphy is a branch of geology interested in studying the .....
A- sedimentary rock textures B- distribution of sedimentary layers in space and time
C- structural relationships of igneous rocks D- sedimentary environments

38- The apparent conformity between rock layers may form an unconformity of the type .....
A- angular unconformity B- paraconformity
C- disconformity D- nonconformity

39- What is the correct order, from oldest to youngest, of the following geologic times?
A- Paleozoic, Precambrian, Cenozoic, Mesozoic
B. Precambrian, Paleozoic, Mesozoic, Cenozoic
C. Cenozoic, Precambrian, Mesozoic, Paleozoic
D. Mesozoic, Paleozoic, Cenozoic, Precambrian

40- The biostratigraphic units can be distinguished on the basis of their .....
A-lithologic types B- chemical composition
C- fossil content D- mineralogical composition

41- The following belongs to the law of superposition, except of:
A- oldest rocks at base B- rocks deposited in caves
C- inclusions hosted by older rocks D- youngest rocks on top

42- A stratotype chosen from a new locality to replace the older (destroyed, covered, or inaccessible) is termed .....
A- holostratotype B- parastratorype C- neostratotype D- genotype

43- The geographic area where the stratotype of a certain stratigraphic unit is located and described is termed the .....
A- type rock B- type region C- type species D- type locality

44- The changes in ocean basin volumes can lead to:
A- tectonic stability B- occurrence of rare fossils
C- metamorphism D- sea-level fluctuations

45- Meteor craters are evidences of .....
A- superposition B- lateral continuity
C- extraterrestrial impacts D- igneous activity

46- The disconformity type is considered a ..... evidence of superposition.
A- tectonic B- chemostratigraphic
C- paleontologic D- stratigraphic

47- The unconformity with more or less regular surface is termed:
A- angular unconformity B- disconformity
C- nonconformity D- paraconformity

48- The greatest interval in the geologic time scale is the .....
A- Period B- System C- Era D- Eon

49- Biostratigraphy establishes .....
A- isochrones B- dichrones C- polychrones D- biozones

50- Which of the following can be used as a basis of correlation of rocks?
A- Lithological characteristics B- Magnetic reversals
C- Fossil associations D- all of them

إنتهت الأسئلة مع أطيب الأمنيات بالتوفيق

Examiners:
Prof. Dr. Magdy S. Mahmoud & Dr. Amr S. Deaf (Geology Department)

Faculty of Science

Assiut University

Thermodynamic Examination of Industrial group students **June 2022**

(208) C Second year **Time: 2 hours**

Q1 Answer the following statements with true (T) or False (F) (1.5 mark for each)

1- The entropy of a gas increases by increasing its temperature.
2- The interal energy change in an isothermal expansion of a gas increases.
3- In an adiabatic compression of a gas the product PV = constant.
4- In a gaseous reaction not accompanied by a change in number of moles $\Delta H = \Delta E$.
5- the molar heat capacity of a gas at constant pressure is higher than that at constant volume.
6- Compounds for which standard heat of formation are negative are apt to be stable.
7- The enthalpy change of any reaction is the sum of heats of formation of both its reactants and products.
8- $\Delta\, Cp = 0$ for a certain reaction , the enthalpy of this reaction is independent on its temperature.
9- In processes carried out at constant pressure the amount of heat taken by the system is equal to the increase in its enthalpy.
10-In isothermal expansion process of a gas the work done by the gas is equal to the amount of heat taken by the gas.
11-For processes carried out at constant volume the amount of heat given to the system is directed to increase its internal energy.
12-For irreversible process the entropy of the universe decreases.
13-When any spontaneous process reaches equilibrium the free energy possess a maximum value.
14-In an isolated system where energy is constant, the entropy reaches some maximum value at equilibrium.

15-For any heat transfer process when the temperature is not uniform, the free energy reached a minimum value and the system will be at equilibrium.

16-The temperature of the system decreases in an adiabatic compression process.

17-The process in which no heat enters or leaves the system is termed as isothermal one.

18-For an exothermic reaction, its equilibrium constant increases by increasing its temperature.

19-When the value of equilibrium constant is more higher or lower than zero the standard free energy change of a reaction can be used for calculating its value.

20-The value of free energy change for the reaction : X +Y→ Z is greater than zero; then an increase in temperature will lead to increase the yield of the product Z.

Q2 Choose the correct Answer A,B,C and D (1.5 mark for each)

1-The temperature of the system increases in an

A) Adiabatic compression B) isothermal expansion

C)Adiabatic expansion D) Isothermal compression

2- which one of the following is false?

A)Work is a state function. B)free energy is a state function.

C)free energy change =0 at equilibrium D) Enthalpy is a state function

3-One heat engine works between two temperatures T1 and T2, its efficiency is

A)T_1-T_2 / T_1 B) T_2-T_1/T_2 C) T_2-T_1/T_1 D) T_1-T_2/T_2

4- A mixture of two moles of carbon monoxide and one mole of Oxygen in closed system are ignited to carbon dioxide the relation between ΔH and ΔE will be

A) $\Delta H < \Delta E$ **B)** $\Delta H > \Delta E$ **C)** $\Delta H = \Delta E$ **D) the relation depends on** ΔC_P

5- The relation between C_P and C_v for a gas is

A) $C_P = C_v$ B) $C_v > C_p$ C) $C_P - C_v = R$ D) $C_P + R = C_v$

6) The latent heat of vaporization of a liquid at 500K and 1 atm. Is 10 Kcal./mole. What will be **ΔE** of 3 moles of the liquid at the same temperature.

A) 13.0 Kcal B) -13.0 Kcal C) 27.0 Kcal D) -27.0 Kcal

7- the work done in liter.atm. for an expansion of one mole of an ideal gas from a volume 10 liters to 30 liters at 27°C is

A) 0.082 B) 16.4 C)8.2 D) 1.64

8- According to the above question the work in calories is:

A)79.38 B)16.4 C)39.68 D)396.88

9- If ΔG^0 for a reaction carried out in electrochemical cell has a negative Sign the cell potential is

A) Positive B)negative C) Zero D) equal to K

10-the heats of formation of CO_g and CO_{2g} are -26.4 and -94.0 Kcal respectively, the heat of combustion of carbon monoxide will be

A) 26.4 Kcal B) -67.6 Kcal C)-120.4 Kcal D)52.8 Kcal

11- For endothermic reaction, the equilibrium constant upon increasing the reaction temperature will be

A)Decrease B)increase C) not change D) equal to one

12- When two moles of water are boiled at 100 °C and converted into vapor at the same temperature if $\Delta H_{vap} = 9590$cal/mol the change in entropy will be

A) 25.71 B) 51.42 C)21.76 D)217.6

13-ΔG^0 for the reaction :X+Y→Z is -4.606 Kcal, the value of equilibrium constant at 227 °C is (R=2 Cal/mol.K) (2 marks)

A)100.0 B) 10.0 C) 2.0 D) 0.01

Oral Estimation

Answer the following questions with sign True (T) or False (F) (1.5 marks for each)

1- The enthalpy change is equal to the heat adsorbed only when the process is carried out at constant pressure.
2- The total entropy change for reversible processes is Zero.
3- Processes for which ΔH are negative were said to be endothermic
4- Each element in its slandered state is assigned entropy zero .
5- The enthalpy of formation of CO gas can be measured by direct calorimetric.
6- Each element in its slandered state is assigned enthalpy zero.
7- For an ideal gas the relation between ΔH and ΔE is $\Delta H = \Delta E - \Delta n RT$ (one mark)

Examiner: Prof.R.M.Gabr

Assiut University
Faculty of Science
Department of Geology

جامعة أسيوط
كلية العلوم
قسم الجيولوجيا

2021/2022 Second Semester, Final Examination		
6 June 2022	On: Geographic Information System (G-240)	Time: 2 hours

Answer the following questions:

First Question: Choose the correct answer: **(36 marks; one mark each)**

1. **_____ are maps of our environment that are stored in our brain, and they are psychological tools that we all use every day.**
   a) Thematic maps b) Mental maps c) Reference maps d) Dynamic maps

2. **_____ refers to define and describe places in relation to other known locations. For instance, Cairo, Egypt, is north of Johannesburg, South Africa.**
   a) Nominal location b) Absolute location c) Relative location d) None of them

3. **GPS technology consists of a constellation of _____ satellites that are orbiting the Earth and constantly transmitting time signals.**
   a) Twenty-four b) Three c) Twenty-three d) Four

4. **The global World Geodetic System of 1984 datum uses the _____ as the origin of the geographic coordinate system and is used for defining locations across the globe.**
   a) Sea level b) Ground elevation c) Centre of the Earth d) None of them

5. **_____ mean(s) putting the information in a database and maintaining access to it.**
   a) Capture b) Spatial Analysis c) Restore and retrieve d) None of them

6. **_____ refers to the factor of reduction of the world, so it fits on a map, and it can be represented by text, a graphic, or some combination of the two.**
   a) Map legend b) Map scale c) Coordinate system d) North arrow

7. **_____ is based on the point at which the axis of the Earth's rotation intersects the Earth's surface.**
   a) True north b) Magnetic north c) Grid north d) None of them

8. **_____ refers to the position of something relative to something else usually along a line.**
   a) Location b) Distance c) Direction d) Navigation

9. **The Mercator projection is an example of a _____ projection and is famous for distorting Greenland.**
   a) Conformal b) Equidistant c) Equal-area d) Equivalent

10. **_____ maps are simply changeable or interactive representations of the Earth.**
    a) Thematic b) Mental c) Reference d) Dynamic

11. **_____ is measured relative to the equator at zero degrees, with maxima of either 90 degrees north at the North Pole or 90 degrees south at the South Pole.**
    a) Longitude b) Prime meridian c) Latitude d) UTM coordinate

12. **_____ occur when the shared boundary of two polygons does not meet exactly.**
    a) Overlaps b) Slivers c) Gaps d) Symmetrical difference

13. **UTM coordinate system divides the globe into 60 N/S zones, each _____ wide.**
    a) 4° longitudes b) 6° longitudes c) 8° longitudes d) 10° longitudes

14. **The raster data model consists of rows and columns of equally sized _____ interconnected to form a planar surface.**
a) Points b) Lines c) Grids d) Pixels

15. **_____ are 2D features created by multiple lines that loop back to create a closed feature. They are used to represent geologic formations, lakes, or vegetation.**
a) Polygons b) Points c) Lines d) Vertices

16. **In the Egyptian Transverse Mercator (ETM) projection system, Egypt was divided into _____ belts/zones.**
a) Two b) Three c) Four d) Five

17. **Each Universal Transverse Mercator (UTM) zone divided into _____ East/West bands, each 8° high lettered from the south pole using C through X letters.**
a) Twenty b) Twenty-one c) Twenty-two d) Twenty-three

18. **The X-value, called the Easting, has a value of _____ at the central meridian of each zone in the UTM coordinate system.**
a) 10,000,000 m. b) 1,000,000 m. c) 750,000 m. d) 500,000 m.

19. **If a certain location has the following geographic coordinates (longitude 39° 10′ 17′′E and latitude 21° 29′ 55′′N), the corresponding UTM zone will be:**
a) Q36 b) Q37 c) R36 d) R37

20. **_____ satellites make use of sensors that detect the reflected or emitted electromagnetic radiation from natural sources.**
a) Geostationary b) Sun-synchronous c) Active d) Passive

21. **A raster model with pixels representing 10 m. by 10 m. in the real world would be said to have a spatial resolution of _____**
a) 100 m. b) 20 m. c) 10 m. d) 1 m.

22. **Landsat-7 satellite maintains _____ radiometric resolution for its bands and can therefore record values for each pixel that range from 0 to 255.**
a) 4-bit b) 8-bit c) 12-bit d) 16-bit

23. **The _____ resolution of a satellite image is the smallest distance between two adjacent features that can be detected in an image.**
a) Spectral b) Temporal c) Spatial d) Radiometric

24. **_____ is the main latitude reference in the ETM projection system.**
a) Equator b) Latitude 22° c) Latitude 25° d) Latitude 30°

25. **_____ resolution denotes the ability of the satellite's sensor to resolve wavelength intervals, also called bands, within the electromagnetic spectrum.**
a) Spectral b) Temporal c) Spatial d) Radiometric

26. **_____ refer to the methods and procedures that are used to transform the spherical 3D Earth into 2D planar surfaces.**
a) Map scales b) Map legends
c) Map projections d) Coordinate systems

27. **_____ circle the Earth proximal to the equator once each day. They yield high temporal resolution but low spatial resolution.**
a) Geostationary satellites b) Sun-synchronous satellites
c) Polar satellites d) None of them

28. **Online maps and GISs are _____ because we can zoom in and out at will.**
a) Large-scale maps
b) Small-scale maps
c) Scaleless maps
d) None of them

29. **City names such as New York, Tokyo, or London refer to _____.**
a) Nominal locations
b) Absolute locations
c) Relative locations
d) None of them

30. **All the following are examples of spatial data except:**
a) Latitude and longitude coordinates
b) Street address
c) Zip code
d) Geologic units

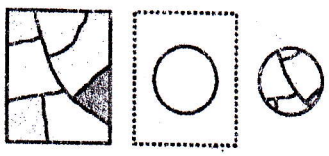
31. **Universal Transverse Mercator (UTM) used from _____**
a) Latitudes 84°N to 84°S
b) Latitudes 84°N to 80°S
c) Latitudes 80°N to 84°S
d) Latitudes 80°N to 80°S

32. **Zone 1 in the UTM system is from _____ longitudes.**
a) 180°W to 170°W
b) 180°W to 160°W
c) 180°W to 174°W
d) 180°W to 164°W

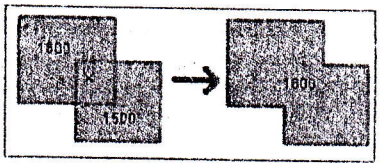
33. **A source of potential error in an aerial photograph is the _____ which arises from the three-dimensional aspect of terrain features.**
a) Curvature
b) Relief displacement
c) Orthophoto
d) Error propagation

34. **In ArcMap, the _____ provides a page view where map elements such as the data frame, a scale bar, and a map title, are arranged on a page for map printing.**
a) Data frame
b) Layout view
c) Table of contents
d) Symbology

35. **The opposite plot refers to _____ vector operation:**
a) Erase
b) Clip
c) Split
d) Intersect



36. **The _____ operation combines features within a point, line, or polygon layer into a single feature with identical attribute information.**
a) Append
b) Dissolve
c) Select
d) Merge



Second Question: True or False: **(14 marks; one mark each)**

37. The geometric transformations that arise during map reprojection efforts can cause problems for raster graphics. ( )

38. The representative fraction describes scale as a simple ratio. The numerator denotes map distance, and the denominator denotes real-world distance. ( )

39. Map projections could be classified as normal, transverse, and oblique in case considering the light source. ( )

40. The "table of contents" in ArcMap, lists all layers on the map and shows what the features in each layer represent. ( )

41. An overlay is a process of taking two or more different thematic maps of the same area and placing them on top of one another to form a new map. ( )

42. The "split" operation is used to divide an input layer into two or more layers based on a split layer. ( )

43. When using decimal degrees, latitudes above the equator and longitudes east of the prime meridian are negative, while latitudes below the equator and longitudes west of the prime meridian are positive. ( )

44. The national geographic coordinates for Egypt (ETM system) have been defined with respect to ellipsoid Helmert 1906. ( )

45. ArcCatalog is used to organize and manage various types of geographic information as logical collections. ( )

46. The small-scale map shows more detail and less area, while the large-scale map shows more area but less detail. ( )

47. Grid north simply refers to the northward direction that the grid lines, of latitude and longitude on a map called a graticule, point to. ( )

48. Health records, soil description, and sample quality are examples of attribute data. ( )

49. Examples of some common types of reference maps include topographic maps, aerial photographs, and satellite images. ( )

50. Constant-width buffers can be made such that a series of concentric buffer zones are created around the originating feature at user-specified distances. ( )

Third Question (Oral): True or False: **(10 marks; one mark each)**

51. GIS is a computer-based information system that enables the capture, storage, modeling, retrieval, analysis, and presentation of geographically referenced spatial data ( )

52. A typical GIS consists of four elements: hardware, software, data, and people. ( )

53. The most prevalent GIS software comes from Environmental Systems Research Institute (ESRI). ( )

54. To determine a position, Earth-based GPS units receive the signals from at least five of these satellites and use this information to triangulate a location. ( )

55. Topological space is concerned with the nature of relationships and the connectivity of locations within a given space. ( )

56. Route knowledge enables us to understand where landmarks are in relation to each other and to take shortcuts. ( )

57. The coordinate system that is most used to define locations on the 3D Earth is called the geographic coordinate system, and it is based on a spheroid. ( )

58. Three fundamental vector types exist in GIS: points, lines, and polygons. ( )

59. The "intersect" operation is used to divide an input layer into two or more layers. ( )

60. The "dissolve" operation combines adjacent polygon features in a single feature dataset based on a single predetermined attribute. ( )

== Good Luck,,, ==

Assoc. Prof. Rashad Sawires

Geology Department Faculty of Sciences Assiut University Second Level		Second Term Examination Rock forming Minerals (230 G) 1.th June, 2020 Two hours

First Question (30 marks, 60 minutes)

Choose the correct answer!

(1) The trioctahedral phyllosilicate minerals are characterized by occupation..... octahedral sites in O-Sheet.
(a) All
(b) 2/3
(c) 1/4
(d) 1/3

(2) ..... cations fill the octahedral sites in the O-sheet in the trioctahedral phyllosilicate
(a) Trivalent
(b) Divalent
(c) Monovalent
(d) Tetravalent

(3) ..... in the dioctahedral phyllosilicate silicate minerals are characterized two $(OH)^-$ thin layers above and below octahedral thin layer.
(a) O-sheets
(b) T-sheets
(c) Tetrahedral sheets.
(d) Silicon tetrahedral sheets.

(4) TOT-phyllosilicate are characterized by the presence.....
(a) two tetrahedral sheets and one octahedral sheet
(b) one tetrahedral sheet and one octahedral sheet
(c) one tetrahedral sheet and two octahedral sheets
(d) two tetrahedral sheets and two octahedral sheets

(5) The side view of the octahedral sheet in the phyllosilicate minerals is.....
(a) tetrahedon
(b) octahedron
(c) trapezohedron
(d) rectangle

(6) The replacement of Si in the tetrahedral sheet in the phyllosilicate results in.....
(a) Insert monovalent cations between layers
(b) Insert OH^- group between layers
(c) Remove two (OH)- group from octahedral sheet
(d) TOT and TO layer structure.

(7) Mica group minerals have.....
(a) TOT+C layer structure
(b) TOT layer structure
(c) TO layer structure
(d) TOT+ O layer structure

(8) Common trioctahedral mica minerals are minerals contain.....
(a) three M^{2+} cations in the octahedral sheet and Ca cation between TOT layers
(b) two M^{2+} cations in the octahedral sheet and Ca cation between TOT layers
(c) two M^{2+} cations in the octahedral sheet and K cation between TOT layers
(d) three M^{2+} cations in the octahedral sheet and K cation between TOT layers

(9) $XY_{2-3}Z_4O_{10}(OH)_2$ is the chemical formula of.....
(a) TOT+C phyllosilicate minerals.
(b) TOT phyllosilicate minerals.
(c) TOT+ O phyllosilicate minerals.
(d) Talc minerals.

(10) The ratio of T-sheet: O-sheet in serpentine mineral is.....
(a) 1:1
(b) 1:2
(c) 2:1
(d) 1:3

(11) Chlorite is commonly secondary mineral after.....
(a) Ca-bearing minerals
(b) Al-minerals.
(c) Mg-Fe minerals.
(c) Al-K minerals.

(12) ..... is a serpentine minerals present as fibrous and tubes shape-crystals.
(a) Lizardite
(b) Crysotile.
(c) Antigorite
(d) Pyroxenoid.

(13) The transformation *α- quartz* to β- quartz is called .....transformation
(a) re-gorganization
(b) re-arrangement
(c) displacive
(d) reconstructive

(14) The feldspar minerals in which 1/3 of Si ions within silicon tetrahedron are replaced by Al ions, are known as .....
(a) plagioclase feldspars
(b) sodium feldspars
(c) potash feldspar
(d) alkali feldspars

(15) ..... is the chemical of anorthite component in feldspar minerals.
(a) $Ca(Al_2Si_2)O_8$
(b) $Na(AlSi_3)O_8$
(c) $K(Al_1Si_3)O_8$
(d) $(K,Na)(AlSi_3)O_8$

(16) The presence of... in the earth surface rocks is a strong evidence for meteorite impact.
(a) tridymite
(b) cristobalite
(c) coesite
(d) β-quartz

(17) There are ..... natural silica polymorphs.
(a) 7
(b) 8
(c) 9
(d) 10

(18) Andensine plagioclase has ..... content.
(a) An_{30-50}
(b) Ab_{30-50}
(c) Or_{30-50}
(d) Wo_{30-50}

(19) The high temperature feldspars are characterized by .....
(a) high the degree of ordering of Al and Si atoms between tetrahedral sites
(b) low the degree of ordering of Al and Si atoms between tetrahedral sites
(c) unmixing exsolution process
(d) perthitic texture

(20) The low temperature feldspars characterize.....
(a) volcanic rocks
(b) plutonic rocks
(c) sedimentary rocks
(d) clastic rocks.

(21) Unmixing intergrowth in low temperature plagioclase feldspars are.....
(a) visible
(b) invisible
(c) macroscopic size
(d) microscopic size

(22) Exsolution albite bodies within orthoclase host crystals are called.....
(a) perthite texture
(b) solid solution
(c) antiperthite texture
(d) optic twining

(23) The Si: O ratio in the amphibole minerals is .....
(a) 4:10
(b) 4:11
(c) 4:8
(d) 1:3

(24) The TOT-I bands within amphibole minerals are linked together from apical oxygen by ....cations.
(a) 5
(b) 6

(c) 7 (d) 1

(25) $W_{0-1}X_2Y_5Z_8\ O_{22}(OH)_2$ is the chemical formulat of..... minerals.
(a) nesosilicate (b) inosilicate
(c) amphibole (d) pyroxene

(26) Ca-amphiboles are characterized by the presence of Ca cations in the ..... sites
(a) tetrahedral silicon (b) two large octahedral sites at apical oxygens of the tetrahedral silicon
(c) five small octahedral sites at apical oxygens of the tetrahedral silicon (d) in the large 12-corodiation sites at the base of the tetrahedral silicon

(27) All amphibole minerals are characterized by .....
(a) two sets of cleavages intersect at about 124° and 56° (b) two sets of cleavages intersect at about 86° and 94°
(c) on sets of cleavages parallel c-axis (d) on sets of cleavages parallel b-axis

(28) The total percentage of the major oxides in all amphibole minerals estimated by microprobe analyses should be.....
(a) around 100 wt.% (b) less than 100 wt.%
(c) higher than 100 wt.% (d) can not be estimated

(29) The crystal lattices of the pyroxene minerals are characterized by occupation of two ..... cations in the octahedral M1 sites.
(a) small (b) large
(c) Ca (d) Na

(30) The chemical formula of the epidote minerals is $(M^{2+})_2.SiO_4.\ (M^{3+})_3\ Si_2O_7.O.(OH)$ which is classified them as ..... minerals
(a) disilicate (b) nesosilicate
(c) mix between disilicate and nesosilicate (d) phyllosilicate

Second Question (10 marks; 20 minutes)

Read the following paragraph and choose the correct another

A rock sample composed of large crystals (phenocrysts) of minerals A and B set in a fine-grained groundmass formed essentially of the minerals C, D, and E The microprobe analyses show that the chemical composition of mineral A is pure SiO2, whereas the chemical composition mineral B composed mainly of SiO_2, Al_2O_3, CaO, and NaO_2, with total major oxides approximately 100 wt%. Both A and B minerals are present in euhedral crystals. While the crystals of mineral A are cracked and show wavy extinction, the crystals of mineral B are characterized by Carlsbad twinning. The mineral C in the groundmass presents in small colorless lath crystals and is characterized by lamellar twinning, low interference color, and oblique extinction. Mineral D presents in shapeless crystals filling the spaces between the mineral C crystal laths. Mineral D crystals are colorless, low interference shows perthitic texture, and simple twinning whereas mineral E presents in colorless flakes characterized by one-set of cleavage, high interference color and uneven extinction.

(1) Mineral A is.....
(a) quartz (b) plagioclase
(c) alkali feldspar (d) pyroxene

(2) Mineral B is.....

(a) quartz
(b) plagioclase
(c) alkali feldspar
(d) Ba-rich feldspar

(3) Mineral C in the groundmass is plagioclase feldspar, which has a chemical composition similar to...

(a) mineral A
(b) mineral B
(c) mineral D
(d) mineral E

(4) Mineral D is alkali feldspar mineral because its crystals are characterized by.....

(a) filling the inter spaces between plagioclase laths in the groundmass
(b) shapeless crystals.
(c) simple twinning
(d) perthitic texture

(5) Mineral E is.....

(a) mica
(b) muscovite
(c) biotite
(d) trioctahedral mica.

(6) $XY_3(Si_3Al)O_{10}(OH)_2$ is the chemical formula of mineral .....

(a) B
(b) C
(c) D
(d) E

(7) Both mineral A and B are.....

(a) inosilicates
(b) nesoosilicates
(c) phyllosicates
(d) tectosilicate

(8)The whole rock sample can be classified as....

(a) acidic
(b) intermediate
(c) mafic
(d) ultramafic

(9) The existence of perthite texture in mineral D indicates.....

(a) slow cooling
(b) rapid cooling
(c) high-temperature crystallization
(d) homogenization process

(10) Mineral D is.....than mineral E.

(a) silica-poor
(b) silica-rich
(c) mg-poor
(d) mg-rich

Third Question (10 marks; 20 minutes)

Read the following paragraph and choose the correct another

A rock sample is composed mainly of olivine, orthopyroxene, clinopyroxene, and plagioclase whereas amphibole presents in subordinate amounts. The rock shows cumulate textures where both olivine and orthopyroxene are present in cumulus crystals, whereas both plagioclase and amphibole occur in shapeless crystals filling the spaces between olivine and orthopyroxene crystals. All mineral phases are fresh and show Y-cracks. The crystals of the mineral olivine, orthopyroxene and clinopyroxene, and plagioclase are colorless whereas amphibole crystals are brown and display strong pleochroism. The

microprobe analyses of plagioclase crystal indicate composition of Ab_5An_{95}, whereas the chemical composition of amphibole is Ca-rich and Na-poor composition.

(1) The rock sample is..... in composition
(a) acidic
(b) basic
(c) ultrabasic
(d) intermediate

(2) The plagioclase is classified as....
(a) andesine
(b) labradorite
(c) bytownite
(d) anorthite

(3) Olivine, orthopyroxene and clinopyroxene are rich in.....
(a) Fe
(b) Si
(c) Mg
(d) Ca

(4) The plagioclase most likely exhibit.....unmixing intergrowth.
(a) visible
(b) invisible
(c) perthite
(d) homogenous

(5) The brown amphibole mineral is most likely attributed to .....
(a) enrichment in Fe
(b) poverty in Si
(c) enrichment in Al
(d) poverty in Ca

(6) The structural unit in pyroxene minerals is .....
(a) TOT-I beam
(b) TOT
(c) TOT+ O
(d) TOT + O

(7) The structural unit in amphibole minerals is .....
(a) TOT-I beam
(b) TOT
(c) TOT+ O
(d) TOT + O

(8) The amphibole and pyroxene minerals are characterized by.....
(a) two sets of cleavages
(b) anhydrous composition
(c) parallel extinction
(d) rich in K

(9) The amphibole and pyroxene minerals are classified as.....
(a) nesosilicates
(b) inosilicates
(c) phyllosilicates
(d) tectosilicates

(10) The presence of Y-cracks in all mineral phases indicates that the rock sample has been subjected to strain.....
(a) after complete crystallization.
(b) before complete crystallization.
(c) during ascending the parent melt.
(d) by internal force.

Geology Department
Faculty of Science
Assiut University

Time: 2 H
Jun 2022

Crystallography (233 G)

Answer the following quations (50 marks)

Indicate by the sign (✓) or (×):

1-All system contain pinacoid ( )
2-Rhombohedron present in hexagonal ( )
3-Tetragonal system contain 6 planes and one four axis ( )
4-Monoclinic system contains two planes ( )
5 Pyramid is closed form ( )
6-Prism is open form ( )
7-Scalenohedron is closed form ( )
8-Cube is closed form ( )
9-A dome is parallel to a axis ( )
10-Pidon has one face ( )
11-All system contains prism form ( )
12-All system contains bipyramid form ( )
13-All system contains cube form ( )
14-All system contains planes ( )
15-All system contains octahedron form ( )
16-All system contains pidon form ( )
17-All system contains a-dome form ( )
18-All system contains b-dome form ( )
19-All system contains di-prism form ( )
20-All system contains pyramid form ( )
21-All system contains center ( )
22-Tetragonal system contains one fourfold ( )
23-Tetragonal system contains four twofold ( )
24-Tetragonal system contains five planes ( )
25-Hexagonal system contains one sixfold ( )
26-Hexagonal system contains six twofold ( )
27-Hexagonal system contains seven planes ( )
28-Orthorhombic system contains three twofold ( )
29-Orthorhombic system contains three planes ( )
30-Trigonal system contains three planes ( )

CHOOSE THE CORRECT ANSWER OF THE FOLLOWING

31-Prism form is:
a-open b-closed c-both
32-First order prism has miller index:
a-110 b-100 c-hko
33-Ditetragonal prism has miller index:
a-110 b-100 c-hko
34-Bipyramid is:
a-open b-closed c-compound
35-Ditetragonal bipyramid has:
a-12 faces b-8 faces c-6 faces
36-First order prism in tetragonal system has:
a-4 faces b-8 faces c-6 faces
37-Miller Index of b dome in monoclinic system
a-110 b-100 c- h0l
38-Ditetragonal prism has:
a-4 faces b-8 faces c-6 faces
39-Second order prism has miller index:
a-110 b-100 c-hko
40-Ditetragonal prism is:
a-open b-closed c-both
41-Prism form in trigonal system is:
a-4 faces b-3 faces c-6 faces
42-Second order prism has miller index:
a-110 b-100 c-hko
43-Miller Index of prism in monoclinic system:
a-110 b-100 c-hko
44-Octahedron is:
a-open b-closed c-compound
45-Dihexgonal bipyramid has:
a-12 faces b-8 faces c-6 faces
46-Trapezohedron is:
a-open b-closed c-both
47-Scalenohedron is:
a-open b-closed c-both
48-Rhombohedron form have:
a-3 faces b-6 faces c-8 faces
49-Cubic form is:
a-4 faces b-3 faces c-6 faces
50-Mineral crystal in octahedronform is
a-fluorite b-pyrite c-all of the above

Oral Exam (10 marks)

Indicate by the sign (✓) or (×) :-

1-The Hexagonal system ($a = b = c$) ($\alpha = \beta = \gamma = 90^o$) ( )

2-The Triclinic System ($a \neq b \neq c$) ($\alpha \neq \beta \neq \gamma = 90^o$) ( )

3-The Monoclinic System ($a \neq b \neq c$) ($\alpha = \gamma \neq \beta = 90^o$) ( )

4-The Cubic System ($a = b = c$) ($\alpha = \beta = \gamma = 90^o$) ( )

5-The Tetragonal System ($a = b = c$) ($\alpha = \beta \neq \gamma = 90^o$) ( )

6-The Trigonal System ($a_1 = a_2 = a_3 \neq c$) ($\alpha = \beta = \gamma = 120^o$) ( )

7-Most crystals have a center of symmetry ( )

8- Interfacial angle is the angle between two faces of a crystal ( )

9-Planes of symmetry are often referred to as mirror image planes ( )

10-When rotation repeats every 180 degrees, then we have or threefold symmetry ( )

Assiut University Faculty of Science Geology Department		جامعة أسيوط كلية العلوم قسم الجيولوجيا

First Semester Final Examination
Geology Students 2nd Level
(Invertebrate Paleontology)

June 2022	G215	50 Degree	Time: 2 hours

Answer the following questions

Q1: State whether the following statements are correct or wrong (1 degree each)

1- The fossil record is generally considered as biased and incomplete ( ).

2- Porifera is considered the most primitive of the multi-cellular animals ( ).

3- The skeletal structure of sponge is made up of Silica ( ).

4- The skeletal structure of Archaeocyatha is characterized by the presence of spicules ( ).

5- Tabulate fossil remains are most common in muddy sediments, while they are rarely found in the carbonate rocks ( ).

6- The index fossil should be widely distributed and has a limited geologic range ( ).

7- All organisms have an unequal chance to be fossilized ( ).

8- The benthonic foraminifera are very important tool for determining the geologic age as well as the paleoenvironmental conditions ( ).

9- Trilobites first appeared during the Early Devonian period and flourished throughout the Lower Paleozoic Era ( ).

10- Gastropod fossil remains have geologic range extends from the Cambrian to the Cretaceous ( ).

11- The ideal "trace fossil" is abundant, geographically widespread, and relatively short range in time( ).

12- Brachiopods often have one valve larger than the other ( ).

13- Graptolites are mostly found in the deep-water black shales ( ).

14- The phylum Brachiopoda is classified into two orders according to the presence of muscles and teeth ( ).

15- The classification of Spongia depends only on their skeletal structure ( ).

16- Tabulata are an extinct reef formation during the Carboniferous ( ).

17- Calcarea fossil remains were flourished during the Paleozoic Era, while their numbers decreased throughout the Mesozoic Era ( ).

18- The superorder Ammonoidea has a geologic range from the Devonian to the Cretaceous ( ).

19- All members of the class Echinoidea has a pentameral symmetry in their earlier stage of growth ( ).

20- Organisms live above seafloor are termed benthonic ( ).

21- Isodont dental plate type of bivalve shell consists of one cardinal tooth below the umbo as well as elongated lateral teeth ( ).

22- The classification of Anthozoa is based on the number of tabulae, skeleton type and skeleton structure ( ).

23- Bivalvia has a geologic range restricted to the Cambrian-Cretaceous, so it is considered important index fossil ( ).

24- The ammonitic suture line in cephalopods has a geologic range restricted Triassic ( )

25- The order Cornacuspongia (Spongia) is characterized by the presence of the ascon, sycon, and lycon types ( ).

26- Irregular echinoids are characterized by five-fold symmetry ( ).

27- Oysters are contained two equal valves having one muscle scar ( ).

28- Anthozoa is marked by the dominance of the medusa form through its life cycle ( ).

29- Inarticulate brachiopod fossil remain are often the most common brachiopod type throughout the geologic time history ( ).

30- The cardinal teeth in bivalve shells usually lie below the umbo ( ).

31- Colonial Tetracoralla corals are subdivided based on the relationship between corallites ( ).

32- Spongia are generally marine animals but in some cases, it could be fresh water ( ).

33- Phylum Archaeocyatha is classified into different classes based on the numbers of walls in their skeletons ( ).

34. Cephalopods fossil remains are very important index fossils during the Cenozoic Era ( ).

Q2: Chose the correct answer; A, B, C or D **(1 degree each)**

1- The foraminiferal wall structure is..... morphological features

A. stable B. unstable C. semi-changeable D. none of them

2- The..... line is the juncture of the growing margin of the two valves in Brachiopods.

A. hinge B. commissure C. pallial D. suture

3- All the following Spongia orders have skeleton made up of silica except.....

A. Calcarea B. Cornacuspongia C. Triaxonida D. Heteractinellida

4- Tetracoralla fossil remains first appeared in the.....Period.

A. Devonian B. Permian C. Silurian D. Ordovician

5- Graptolithina fossil record were existed up to the ..... Period.

A. Triassic B. Devonian C. Jurassic D. Cretaceous

6- Fresh water Spongia is restricted to the.....Period.

A. Jurassic B. Triassic C. Carboniferous D. Cambrian

7- Dendritic Graptolites lived until the ..... Period

A. Carboniferous B. Permian C. Devonian D. Cambrian

8- Archaeocyatha has a geologic range restricted to the..... Period.

A. Cambrian B. Cretaceous C. Jurassic D. Paleocene

9- The totality of fossils of the organisms that belong to the animal kingdom, which inhabited the Earth and being fossilized in sedimentary layers, is named the.....

A- fossil flora B- fossil fauna C- fossil record D- fossil remains

10- The interlocking plates that are arranged in 10 double columns radiating out from the top of the upper surface of Echinoidea are termed the.....

A. apical system B. corona C. madreporite D. none of them

11- The Order Spongia ..... is known as stone sponge.

A. Calcarea B. Cornacuspongia C. Tetracxonida D. Heteractinellida

12- Numerous teeth are arranged along a straight or curved hinge are termed.....

A. taxodont B. schizodont C. isodont D. cryptodont

13- Tabulate fossil remains are characterized by the occurrence of.....as skeletal elements.

A. tabula B. septa C. dissepiments D. a and b

14- .....is a physical factor that affect the distribution of foraminifera in an indirect way.

A. salinity B. alkalinity C. light D. depth

15- Trilobites reached their acme at the..... boundary.

A. Cambrian/Ordovician B. Paleocene/Eocene C. Permian/Triassic D. Triassic/Jurassic

16- Fusulinid larger foraminifera has a.....age.

A. Mesozoic B. Cenozoic C. Paleozoic D. Paleocene

Good Luck,,,

Prof. Dr. Gamal Zidan Abdelaal

Assiut University
Faculty of Science
Department of Geology

Date: June 2022
Time allowed: 2 hours

Final Exam

Principles of Geophysics (G250), (50 marks Final + 10 marks Oral)

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PART I FINAL:

A) Mark the following statements with True (√) or False (X): (30 marks, one mark each)

Statement	True	False
1. Electrical resistivity is a passive method whereas self-potential is an active method.		
2. With increasing water content, the electrical resistivity of earth materials increases		
3. Porosity is one of the fundamental factors controlling the electrical resistivity of sedimentary rocks		
4. By increasing the electrode spacing, more of the injected current will flow to shallower depths		
5. One of the disadvantages of electrical resistivity method that the electrodes must be in a good contact with soil		
6. Electrical resistivity method is best suited for groundwater exploration		
7. Spontaneous polarization method is based on the surface measurement of natural potentials resulting from electrochemical reactions in the subsurface		
8. The sign of the self-potential is an important diagnostic factor in the interpretation of SP anomalies		
9. Electrokinetic potentials result from the flowing of fluid through a capillary or porous medium		
10. The interpretation of SP is mostly quantitative		
11. Sato and Mooney (1960) have provided the most complete explanation of the electrochemical processes caused the mineral SP anomalies		
12. Self-potential can be used to map the locations of water seepage in dams.		
13. The gravity field is perpendicular to the surface of the earth whereas the magnetic field direction varies.		
14. The Geoid is defined as a surface with unequal gravitational field.		
15. The gravity acceleration at the pole is smaller than that at the equator		
16. The typical gravity anomaly size does not vary greatly because of the very narrow range of rocks density		
17. The range of gravitational acceleration at the Earth's surface ranges from approximately 9.78 m/s^2 at the poles to 9.83 m/s^2 at the Equator		
18. Ore deposit such as galena and pyrite represent a good target for gravity survey		
19. Seismic wave is defined as the transfer of energy by way of particle motion		

20. The higher the value of the modulus, the stronger the material, and the smaller the strain produced by a given stress		
21. Primary seismic waves are slower than secondary seismic waves		
22. Secondary seismic waves can travel through liquids		
23. Hidden layer can produce a problem in seismic refraction interpretation		
24. Seismic refraction method can be used to map subsurface faults		
25. The magnetic method is used to investigate subsurface geology on the basis of anomalies in the earth's magnetic		
26. The magnetic method can be used to map subsurface non-ferrous metals		
27. The inclination reaches its maximum (90°) at the equator		
28. Rocks with small concentration of ferro or ferri-magnetic minerals have the highest magnetic susceptibility values		
29. The range of magnetic field strength at the Earth's surface ranges from approximately 60000 nT at the poles to 30000 nT at the Equator		
30. Magnetic susceptibilities of basic rocks are higher than sedimentary rocks		

B) Choose the correct answer of the following: - (20 marks, one mark each)

31) Geophysical methods can be classified as:

a- Pure vs applied
b- Active vs passive
c- Surface vs borehole
d- All the above

32) The electrical conduction occurred by the free electrons in metallic minerals is called:

a- Electronic conduction
b- Electrolytic conduction
c- Dielectric conduction
d- Atomic conduction

33) Which of the followings control the resistivity of clay free and saturated rocks in Archie's law:

a- Pore fluid saturation
b- Resistivity of pore fluid
c- Pore water resistivity
d- All the above

34) The presence of clay minerals tends to decrease the resistivity because clay minerals:

a- Can combine with water
b- Can absorb cations in an exchangeable state on the surface
c- Tend to ionize and contribute to the supply of free ions
d- All the above

35) Choosing the best electrode array for resistivity survey depends on:

a- Type of structure to be mapped
b- Sensitivity of the resistivity meter
c- Background noise level
d- All the above

36) Electrical resistivity method can be used to map:

a- Groundwater
b- Minerals and Ore deposits
c- Paleochannels
d- All the above

37) The presence of sulfide ore deposits can result in:

a- Low positive SP anomaly
b- High negative SP anomaly
c- High positive SP anomaly
d- Low negative SP anomaly

38) Electrochemical potential is also called:

a- Liquid-junction potential
b- Bioelectric potential
c- Streaming potential
d- a and b

39) To make Self-Potential measurements we need:

a- High impedance voltmeter
b- Electric wires
c- Non-polarizable electrodes
d- All the above

40) The non-polarizable electrode is consisting of:

a- Porous pot
b-Metallic electrode
c- Super saturated solution of the same electrode
d- All the above

41) SP anomalies are often interpreted qualitatively by:

a- Profile shape
b-Amplitude
c- Number of layers
d- a and b

42) The variation in gravity acceleration from the pole to the equator equals to:

a- 10%
b-5%
c- 1%
d- 0.5 %

43) The most factor controlling the density of sedimentary rocks is:

a- Compaction
b- Age
c- Depth of burial
d- Porosity and fluid content

44) The correction of gravity data due to the variation in density of earth materials is called:

a- Drift correction
b- Free air correction
c- Latitude correction
d- Bouguer correction

45) Bulk modulus is defined as:

a- Shear stress over shear strain
b- Volume stress over volume strain
c- Shear stress over volume strain
d- Volume stress over shear strain

46) The angle of incidence that results in an angle of refraction equals to 90° is called:

a- Absolut angle of refraction
b- Relative angle of refraction
c- Critical angle of refraction
d- None the above

47) To record arrival times of seismic waves on land we use:

a- Hydrophones
b-Electrodes
c- Geophones
d- Resistivity meters

48) We can increase the penetration depth in electrical resistivity by:

a- Decreasing the current electrode spacing
b- Decreasing potential electrode spacing
c- Increasing the potential electrode spacing
d- Increasing the current electrode spacing

49) The magnetic susceptibilities of rocks depend on the:

a- Type of magnetic minerals
b- Concentration of magnetic minerals
c- Type and concentration of metallic minerals
d- a and b

50) The magnetic method can be used to map the followings except:

a- Unexploded ordnance
b- Archaeological feature
c- Buried tanks and drums
d- Non-ferrous ore deposits

PART II OTHER:

C) Oral questions (10 Marks)

Mark the following statements with True (√) or False (X): (one mark each)

Statement	True	False
51. The measured parameter in seismic refraction survey is the travel times of refracted seismic energy		
52. In mining geophysics, geophysical methods are used for groundwater exploration.		
53. Water filled voids will display a conductive response compared to air filled voids		
54. Spontaneous polarization method is based on the surface measurement of natural potentials resulting from electrochemical reactions in the subsurface		
55. Sato and Mooney (1960) have provided the most complete explanation of the electrochemical processes caused the mineral SP anomalies		
56. The force of attraction between two bodies is directly proportional to the square of the distance between them		
57. The gravity acceleration of plutonic igneous rocks is greater than the volcanic rock		
58. Eötvös correction is applied to gravity data when a gravimeter is mounted on a moving platform		
59. Ore deposit such as galena and pyrite represent a good target for gravity survey		
60. The magnetic method is used to investigate subsurface geology on the basis of anomalies in the earth's magnetic		

==========Best wishes==========

Assiut University **Faculty of Science**
Geology Department **Time: 2 H**
Ju. 2022

Optical Mineralogy (235 G)

Indicate by the sign (✓) or (×) (50 marks):

1-Metallic oxides (ores) is black ( )
2-Metallic oxides have crystals refract light ( )
3-The absorption is always proportional to the thickness of the crystal ( )
4-When the absorption of light is homogenous in all the wave lengths, the crystal appears to be white ( )
5-The absorption increases, the crystal gradually appears to be grayish ( )
6-Colourless minerals in thin section have white light passes unaffected through the mineral ( )
7-Colourless minerals in thin section have no of its wavelengths is absorbed ( )
8-Opaque minerals (metallic ores) all wavelengths are absorbed ( )
9-Habit is depending on the orientation of the grain ( )
10-Cleavage is related to planes of weakness in atomic structure of the minerals ( )
11-Cleavage is good developed it is called partings ( )
12-The number of cleavages seen depends upon the shape of the mineral section ( )
13-A portion of a single euhedral crystal of calcite showing rhombohedral cleavage ( )
14-Quartz have irregular fractures and they do show cleavage ( )
15-Relief is negative when the grain has higher refractive index than its surroundings, negative if lower ( )
16-The refractive index of **some** anisotropic minerals is depending on the vibration direction of the light within the crystal ( )
17-Refractive index (N) of Canada balsam is 1.74 ( )
18-Refractive index of garnet mineral =1.88 ( )
19-Refractive index of halite mineral =1.54 ( )
20-Refractive index of fluorite mineral =1.43 ( )
21-Ordinary ray have refractive index > Refractive index of medium ( )
22-Extraordinary ray have Refractive index = refractive index of medium ( )
23-Sanidine is with simple twin ( )

24-Orthoclase is with simple twin ( )
25-Biotite has one cleavage ( )
26-Pyroxene has two cleavages ( )
27-Amphiboles have two cleavages ( )
28-Olivine has a parting ( )
29-Polysynthetic twinning (albite twinning) is present in plagioclase ( )
30-Cross-hatching twinning is occur n microcline ( )
31-Is an albite, simple, and pericline twinning occur in biotite ( )
32-Minerals whose optical orientations are uniaxial ( )
33-Biaxial not has optical orientations ( )
34-The variation in interference colour which the grains of a certain mineral present depends on the shape of the grain ( )
35-The interference colour varies from nil for the vertical cut to a maximum value represented by the vertical cut, passing through a series of intermediate colours corresponding to the inclined cuts ( )
36-Different intermediate colours of grains of different mineral are due to different orientations ( )
37-The limit between the various orders interference colour is fixed in the mixture between violet and green ( )
38-Minerals with relatively weak color like chlorite, or actinolite, will show interference colors very different from colorless minerals ( )
39-Minerals that have cleavage or elongation not have an extinction angle ( )
40-Minerals with undulose extinction, solid solution/zonation, or other factors that may inhibit this measure and may be use ( )
41-Minerals belonging to the tetragonal, hexagonal, trigonal or orthorhombic crystal systems will in general show straight extinction ( )
42-Minerals belonging to the monoclinic system will often show inclined extinction but may sometimes show straight extinction ( )
43-Extinction behavior is a function of the relationship between indicatrix orientation and crystallographic orientation ( )
44-All uniaxial minerals show parallel extinction ( )
45-Orthorhombic minerals show parallel extinction ( )
46-Monoclinic minerals: indicatrix axes do not coincide with crystallographic axes ( )
47-These minerals have inclined extinction and extinction angle helps to identify them ( )
48-The indicatrix is a sphere of the isotropic mineral ( )
49-The birefringence of the isotropic mineral is zero ( )
50-The retardation of the isotropic mineral is zero ( )

Oral Exam (10)

Choose the correct answer of the following

1-The most characteristic mineral twins are

a-feldspar b-bioteite c-muscovite d-all of these

2-Cross-hatching occur in

a-hornblende b-plagioclase c-microcline d-all of these

3-A simple twin occur in

a-hornblende b-plagioclase c-orthoclase d-all of these

4-Polysynthetic or albite twins occur in

a-olivine b-plagioclase c-orthoclase d-all of these

5-Parting occur in

a-olivine b-plagioclase c-orthoclase d-all of these

6-Biaxial minerals have

a-Two optic axis directions b-One optic axis direction
c-no optic axis direction

7-Uniaxial minerals have

a-Two optic axis directions b-One optic axis direction
c-no optic axis direction

8-Isotropic mineral have

a-Two optic axis directions b-One optic axis direction
c-no optic axis direction

9-Mineral have brown colour is

a-hornblende b-biotite c-chlorite d-all of these

10-Mineral show colourless is

a-quartz c-tourmaline c-biotite d-all of these

Good luck

Prof. Dr. Mohamed Abd El-Raouf Hassan

Assiut University *Faculty of Science* *Geology Department*		*June, 2022* *Time: 2 hours*

Level two examinations

Course No. (G234)

Part I

A-Mark right (✓) or (×) wrong: (30 Marks)

1. ( ) *Prism is an open form.*
2. ( ) *Prism may be found in all systems.*
3. ( ) *{111} is a general form.*
4. ( ) *Bipyramid may be found in all systems.*
5. ( ) *Pinacoids parallel 2 axes.*
6. ( ) *Domes parallel 1 axis.*
7. ( ) *Bipyramids always cut all axes.*
8. ( ) *First order denotes axes from edges.*
9. ( ) *{10$\bar{1}$0} is b-dome.*
10. ( ) *{100} in tetragonal is a-pinacoid.*
11. ( ) *{011} is a-dome.*
12. ( ) *{001} is c- pinacoid.*
13. ( ) *{210} is tetragonal prism.*
14. ( ) *Trigonal, tetragonal and orthorhombic systems are dimetric.*
15. ( ) *{hhl} in cubic system is trisoctahedron.*
16. ( ) *{100} in cubic system is a-pinacoid.*
17. ( ) *Domes are closed forms.*
18. ( ) *Trigonal has no horizontal plane of symmetry.*
19. ( ) *Rhombic dodecahedron has six facies.*
20. ( ) *Indicatrix represents refractive indices.*
21. ( ) *Pleochroism is the change of colour.*
22. ( ) *Isotropic sections are always cubic.*

23.( ) Double refraction is characteristic for all minerals.
24.( ) The indicatrix of cubic crystals is a sphere.
25.( ) Pleochroism is observed between crossed nicols.
26.( ) Extinction of uniaxial crystals is parallel.
27.( ) Twinkling is an expression of double refraction.
28.( ) Absorption is expressed in interference colour.
29.( ) Refractive index of ordinary ray is greater than that of extraordinary ray in positive uniaxial crystals.
30.( ) Twinkling is the change of grain boundaries.

B- Mark the proper choice to fill the space: (20 Marks)

31. There are 3 planes of symmetry except in the ..... system.
a) Orthorhombic b) Tetragonal c) Trigonal
32. Bypyramid may be ..... form
a) Special b) General c) Both
33. Hexagonal prism may be found in ..... system
a) Hexagonal b) Trigonal c) Both
34. Rhombohedron may be found in ..... system
a) Cubic b) Trigonal c) Both
35. a-dome is found in ..... system
a) Trigonal b) Orthorhombic c) Tetragonal
36. Three 2-fold axes are found in ..... crystals
a) Monoclinic b) Trigonal c) Hexagonal
37. The cube is characterized by 3-fold
a) 2 b) 3 c) 4
38. b-dome parallels ..... axis
a) c b) b c) a
39. {100} is the index of .....
a) a-pinacoid b) Tetragonal prism c) Both
40. {101} is the index of ..... order bipyramid
a) First b) Second c) Third
41. Ditrigonal scalenohedron has ..... facies
a) 6 b) 8 c) 12

42. Domes are ….. forms
a) Closed b) Open c) General
43. Relief is the change of …..
a) Colour b) Refractive index c) Both
44. An ellipsoid of rotation is the indicatrix of ….. crystals
a) Cubic b) Tetragonal c) Orthorhombic
45. Interference colours are observed in the presence of …..
a) Polarizer b) Analyzer c) Both
46. Change of grain boundaries is caused by …..
a) Polarizer b) Crossed nicols c) Double refraction
47. The following properties are observed between crossed nicols except …..
a) Interference colour b) Interference figure c) Extinction
48. Twinkling is the change of grain …..
a) Boundaries b) Colour c) Both
49. Extinction in trigonal crystals is …..
a) Parallel b) Oblique c) Both
50. Interference colour is caused by …..
a) Retardation b) Absorption c) Both

Part II

Mark right (✓) or (×) wrong: (10 Mark)

51. ( ) {100} may be the index of a prism.
52. ( ) The number of open forms in cubic is 3.
53. ( ) {111} is a general form.
54. ( ) Octaherdron is found in cubic system.
55. ( ) $\{11\bar{3}0\}$ is a possible index.
56. ( ) Trigonal has no horizontal plane.
57. ( ) Optical orientation represents refractive indices.
58. ( ) Relief is an expression of double refraction.
59. ( ) Dimetric crystals are optically uniaxial.
60. ( ) Extinction is observed in plane polarized light.