ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

M.Sc. (APPLIED GEOLOGY)

COURSE CODE : 367

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 367

Time : 2 Hours   Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you –1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. In a monoclinic crystal

(A) all the three crystallographic axes are inclined to each other

(B) all the three crystallographic axes are mutually perpendicular to each other

(C) one of the crystallographic axes is inclined to other two mutually perpendicular axes

(D) there are three horizontal and one vertical crystallographic axes

2. Tetragonal system is characterized by the presence of

(A) 4-fold axis of symmetry

(B) 6-fold axis of symmetry

(C) 3-fold axis of symmetry

(D) at least two improper axes of symmetry

3. The total number of crystal classes are

(A) 32 (B) 7 (C) 264 (D) 30000

4. The minerals of amygdules usually reflect the composition of the host rock. For example those basalts bearing nepheline commonly contain zeolites. What mineral in the source rock can cause the formation of Chalcedony?

(A) Chalcocite (B) Calcite

(C) Sodalite (D) Silica

5. Quartz grains embedded in large single crystals of feldspars have shapes that resemble the characters of cuneiform writing. This texture is known as

(A) Corona (B) Symplectitic

(C) Graphic (D) Ophitic

6. The recent earthquake in Chile is probably due to

(A) continent-continent collision between South America and North America

(B) Subduction of Nazca plate below South American plate

(C) Oceanic upwelling off coast of Chile

(D) Eruption of volcano in Chile

7. Chandrayan-1 mission of India was a mission to

(A) launch a remote-sensing satellite in earth's orbit

(B) send an orbiter in Moon's orbit

(C) detect life on Moon

(D) send a living being on Moon

8. Subduction is likely to happen in which of the following cases

(A) a oceanic plate moving towards a continental plate

(B) a continental plate moving towards another continental plate

(C) a continental plate moving past another continental plate

(D) oceanic plate moving away from another oceanic plate

9. Most of the earthquakes originate at

(A) plate margins

(B) plate interiors

(C) volcanic centers

(D) ocean-continent junctions

10. Climate change is a bigger threat to coastal countries like Bangladesh because

(A) More temperature would increase in lower latitudes

(B) More carbon dioxide is emitted by coastal countries

(C) Sea level rise due to melting of continental glaciers would drown the land in coastal countries

(D) Fishes would die due to increase in temperature

11. A radioactive isotope with half life of 10 hours would decay to one fourth of its original amount in

(A) 40 hours (B) 20 hours (C) 2.5 hours (D) 5 hours

12. A radioactive isotope with atomic number 19 and mass 40 decays by beta decay. The atomic number and mass of the daughter isotope would be

(A) 20, 40 (B) 18, 40 (C) 20, 41 (D) 18, 41

13. Which of the following is NOT an example of thermodynamic state function?

(A) Enthalpy

(B) Entropy

(C) Gibbs free energy

(D) Work done

14. Plate tectonic like processes are not observed during recent time on any planet other than earth because

(A) no other planet has lithosphere similar to the Earth

(B) no other planet's lithosphere is broken in fragments

(C) no other planet has internal heat energy left to drive such processes

(D) no other planet has water

15. Earthquakes with focus deeper than 650 km are not observed because

(A) no brittle material is present deeper than that depth

(B) seismic waves travelling from deeper parts do not reach on surface

(C) liquid mantle does not allow s-waves to propagate

(D) instruments are not capable to record earthquakes from deeper parts

16. The three most abundant silicate minerals in the earth's continental crust are:

(A) Quartz, olivine, pyroxene

(B) Quartz, feldspar, pyroxene

(C) Quartz, feldspar, mica

(D) Feldspar, pyroxene, mica

17. Which one of the following minerals occurs as a phenocryst in basalt?

(A) Quartz (B) Biotite

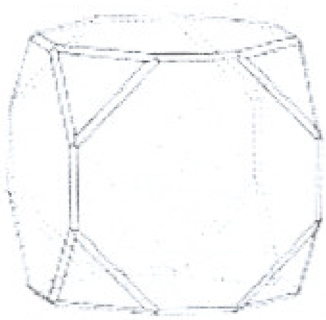
(C) Microcline (D) Olivine

18. Rocks exhibiting hypidiomorphic texture were formed as:

(A) Metamorphic rocks (B) Plutonic rocks

(C) Continental volcanic rocks (D) Submarine volcanic rocks

Study the Figure below and answer the following three questions:



19. How many four fold axis of symmetry are present?

(A) 4 (B) 6 (C) 3 (D) 2

20. The mirror planes of symmetry are perpendicular to the ———— fold axis of symmetry.

(A) 2 (B) 3 (C) 4 (D) 6

21. This crystal consists of ______ forms.

(A) Cube and tetrahedron

(B) Cube and octahedron

(C) Dodecahedron and tetrahedron

(D) Hexagon and octahedron

22. Minerals that belong to sheet silicates have good cleavage parallel to ———— crystallographic planes.

(A) (100) (B) (010) (C) (001) (D) (110)

23. Which one of the following is an open form?

(A) Dome (B) Tetrahedron

(C) Octahedron (D) Dodecahedron

24. Phenocrysts of quartz are found in

(A) Andesite (B) Basalt (C) Rhyolite (D) Dacite

25. In an igneous rock ———— cannot occur along with quartz under equilibrium conditions.

(A) Hypersthene (B) Nepheline

(C) Hornblende (D) Magnetite

26. Syenites are essentially made up of

(A) Plagioclase feldspars

(B) Alkali feldspars

(C) Plagioclase feldspars and augite

(D) Diopside and quartz

27. The discontinuous series in the Bowen's reaction series consists of minerals:

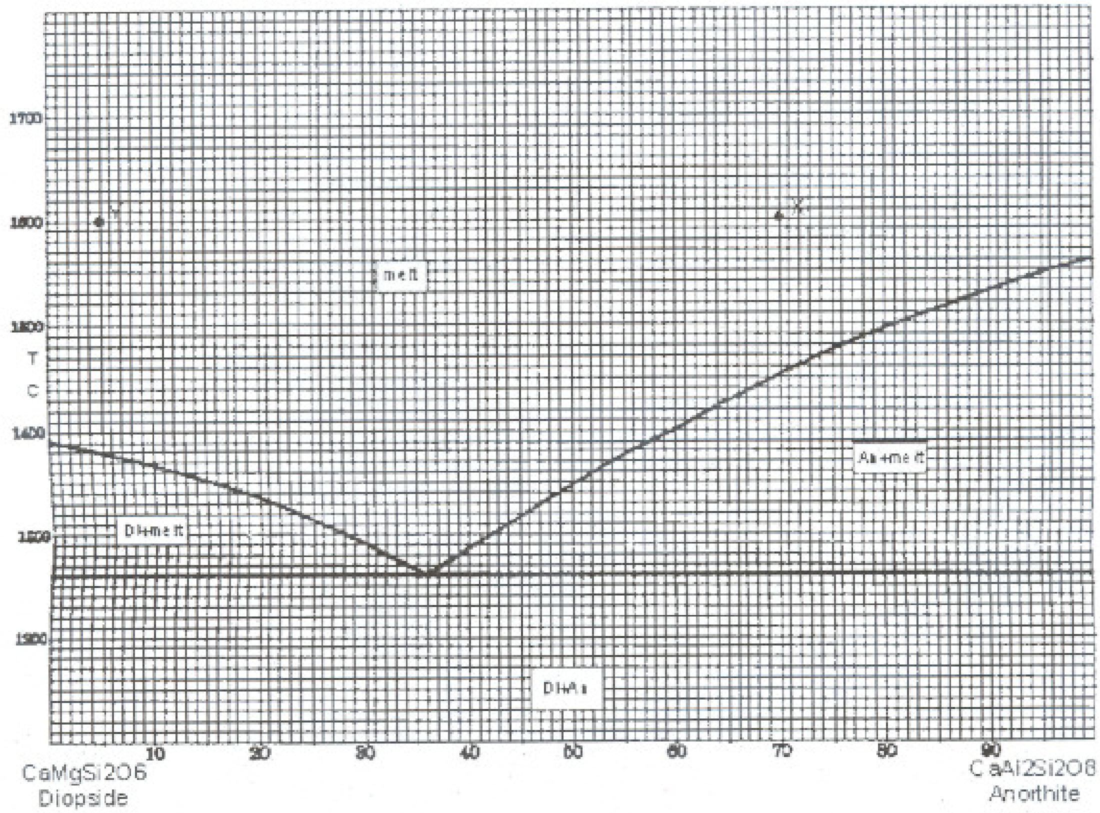
(A) Olivine, pyroxene, anorthite, albite

(B) Olivine, amphibole, anorthite, albite

(C) Olivine, pyroxene, albite, quartz

(D) Olivine, pyroxene, amphibole, biotite

Study the diopside-anorthite phase diagram for 1 atmospheric pressure given below and answer the following three questions:



28. A melt of composition X is cooled slowly. At what temperature crystallization of first phase will take place?

(A) 1800°C (B) 1660°C (C) 1460°C (D) 1400°C

29. What will be the composition of the first phase to crystallize from this melt?

(A) Anorthite
(B) Diopside
(C) 50% dioside + 50% anorthite
(D) 70% anorthite + 30% diopside

30. What is the composition of the melt when it reaches the eutectic?

(A) Di 36% and An 64%
(B) Di 64% and An 36%
(C) Di 30% and An 70%
(D) Di 70% and An 30%

31. A fault in which hanging wall moves down relative to footwall is

(A) Reverse fault
(B) Thrust Fault
(C) Normal fault
(D) Transform Fault

32. The angle between strike line and lineation measured on a vertical plane is

(A) Plunge (B) Dip (C) Pitch (D) Rake

33. Fault is an example of

(A) Brittle Deformation
(B) Ductile Deformation
(C) Brittle-Ductile deformation
(D) Malleability

34. Which of the following is the fold with parallel arrangement of limbs?

(A) Inverted Fold
(B) Isoclinal Fold
(C) Reclined Fold
(D) Symmetrical Fold

35. If the rake of net slip of a fault is 90°, the fault may be

(A) Strike slip fault
(B) Dip slip fault
(C) Diagonal slip fault
(D) Tear fault

36. An outcrop in which older rocks are surrounded by younger rocks is known as

(A) Overlap (B) Offlap (C) Outlier (D) Inlier

37. The dip direction of an inclined plane is always ———— to the line of intersection of the inclined plane with an imaginary horizontal plane.

(A) parallel
(B) perpendicular
(C) 45°
(D) oblique

38. Pitch of a linear structure lying on a plane is defined as the angle between the

(A) Linear structure and the strike line of the plane
(B) Horizontal projection of the linear structure and the strike line of the bed
(C) Linear structure and its horizontal projection
(D) Linear structure and its vertical projection

39. Cleavage is a

(A) Primary planar structure
(B) Primary linear structure
(C) Secondary planar structure
(D) Secondary linear structure

40. In metamorphosed calc-silicate rocks, one of the following sequence of minerals appears in the mineral assemblage with increasing metamorphic grade

(A) Tremolite — Diopside — Talc — Forsterite

(B) Talc — Forsterite — Diopside — Tremolite

(C) Talc — Tremolite — Diopside — Forsterite

(D) Forsterite — Tremolite — Talc — Diopside

41. Sapphirine+Quartz assemblage indicates ———— metamorphic condition.

(A) high pressure

(B) ultra-high pressure

(C) ultra-high temperature

(D) low pressure

42. In case of dynamic metamorphism, the principal agent of metamorphism is

(A) Temperature

(B) Fluid

(C) Deviatoric stress

(D) Both temperature and deviatoric stress

43. Metamorphic grade refers to

(A) intensity of metamorphism

(B) collection of mineral assemblages from rocks of various bulk composition that crystallized at same P, T condition

(C) particular mineral observed at a specific P, T condition

(D) specific P, T condition of metamorphism

44. Which of the following rocks is completely unfoliated?

(A) Slate (B) Hornfels (C) Schist (D) Phyllite

45. The conversion of eclogite to amphibolite facies is an example of

(A) Prograde metamorphism

(B) Retrograde metamorphism

(C) Autometamorphism

(D) Burial metamorphism

46. What is an irregular suture-like boundary developed in limestone, formed by pressure-controlled solution followed by immediate local redeposition called?

(A) Stylolite

(B) Ammoniatic suture

(C) Secondary fracture

(D) None of the above

47. A geologic surface that separates younger strata from older strata and represents a time of non-deposition, where horizontally parallel strata of sedimentary rock are deposited on tilted and eroded layers that may be either vertical or at an angle to the overlying horizontal layers is named as

(A) Angular Unconformity Surface
(B) Paraconformity Surface
(C) Nonconformity surface
(D) None of the above

48. Which of the following minerals would be most likely to form a clay mineral during chemical weathering?

(A) Iron oxide
(B) Mica
(C) Calcite
(D) Quartz

49. A clastic rock is:

(A) a rock formed from the cementation of transported grains
(B) a rock formed from evaporation of sea water
(C) transformed by heat into limestone
(D) transformed by pressure into limestone

50. What are the two most abundant elements in the Earth's crust?

(A) Iron and magnesium
(B) Oxygen and silicon
(C) Nitrogen and oxygen
(D) Silicon and calcium

51. What is probably the single most important, original, depositional feature in sedimentary rocks?

(A) Sizes of the sand grains
(B) Degree of lithification
(C) Bedding or stratification
(D) Compaction of the mud and clay

52. Which of following sedimentary rocks indicate long-distance transportation of the sediments?

(A) Quartz sandstone
(B) Breccia
(C) Arkose (sandstone with lots of feldspar particles)
(D) None of above

53. Which of the following types of sediments are most abundant?

(A) Coarse elastics
(B) Fine elastics
(C) Chemical
(D) Biochemical

54. Which of the following types of currents can transport sand grains?

(A) Rivers
(B) Wind
(C) Ocean waves
(D) All of these

55. Which of the following lists is written in order of decreasing particle size?

(A) Sandstone, siltstone, conglomerate
(B) Sandstone, conglomerate, siltstone
(C) Conglomerate, sandstone, siltstone
(D) Siltstone, sandstone, conglomerate

56. What is the difference between a breccia and a conglomerate?

(A) Breccias are coarse grained and conglomerates are fine grained
(B) Conglomerates are coarse grained and breccias are fine grained
(C) Breccias have rounded fragments and conglomerates have angular fragments
(D) Breccias have angular fragments and conglomerates have rounded fragments

57. A sandstone with abundant rock fragments and clay minerals is a(n).

(A) arkose
(B) litharenite
(C) quartz arenite
(D) shale

58. A local water table positioned above the regional water table is said to be:

(A) stranded
(B) perched
(C) displaced
(D) depressed

59. The ability of an Earth material to transmit water is a measure of its:

(A) porosity
(B) aquifer characteristics
(C) chemical cement
(D) permeability

60. The percentage of a rocks total volume that is taken up by pore space is called the

(A) permeability
(B) recharge
(C) aquifer
(D) porosity

61. Dunes tend to form:

(A) parallel to the prevailing winds
(B) perpendicular to the prevailing winds
(C) either or both of the above at times
(D) they have no relation to wind direction

62. The gently sloping, shallowly-submerged surface extending from the shoreline toward the deep ocean is termed:

(A) continental shelf
(B) submarine canyon
(C) continental slope
(D) ocean basin

63. The core of the earth is composed primarily of:

(A) iron and sulfur
(B) iron and nickel
(C) nickel and cobalt
(D) silicon and oxygen

64. The Ordovician period is known as the age of

(A) crinoids (B) graptolites (C) brachiopoda (D) corals

65. The drainage pattern which signifies an area lacking structural control is

(A) radial (B) rectangular (C) dendritic (D) trellis

66. The most ancient ancestor of man seems to have appeared during

(A) Paleocene (B) Eocene (C) Pliocene (D) Pleistocene

67. Mechanical wear by rivers, wind etc are called as

(A) deflation (B) saltation (C) corrosion (D) solifluction

68. Fossil Ammonites indicate __________ age.

(A) Cretaceous (B) Tertiary (C) Carboniferous (D) Cambrian

69. Most fossils are of creatures that lived in

(A) rivers (B) the sea (C) fresh water (D) the land

70. Dolostone is formed by addition of __________ to the limestone.

(A) calcium (B) iron (C) sodium (D) magnesium

71. Which of the following is not a lithostratigraphic unit?

(A) Group (B) Formation (C) Series (D) Member

72. One of the following is not a requirement for coral reef growth.

(A) warm water
(B) abundant sunlight
(C) shallow water
(D) abundant amount of suspended sediments

73. Which group provides the fast moving invertebrate?

(A) Cephalopoda (B) Echinodermata

(C) Gastropoda (D) Brachiopoda

74. The bottom dwellers living between low tide and high tide area are termed as

(A) vagile (B) sessile (C) nektonie (D) littoral

75. The age of Cuddapah Super group is approximately

(A) 1000 Ma (B) 1200 Ma (C) 1600 Ma (D) 2000 Ma

76. The fossil contents of elementary canal of animals are known as

(A) burrows (B) mould (C) trails (D) coprolites

77. Hercynian or Variscan orogeny took place during

(A) Silurian (B) Devonian

(C) Permo-Carboniferous (D) Jurassic

78. Petrified wood is an example of

(A) encrustation (B) substitution

(C) altercation (D) desiccation

79. Gold deposits are NOT associated with one of the following.

(A) Quartz lode (B) Banded iron formation

(C) Conglomerate (D) Shale

80. Uranium deposits have NOT formed by one of the following processes.

(A) Detrital sedimentary (B) Circulation of groundwater

(C) Hydrothermal (D) Magmatic

81. India is a leading producer of one of the following metals.

(A) Gold (B) Aluminium (C) Copper (D) Uranium

82. One of the following sulphide minerals can be transluscent or transparent.

(A) Pyrite (B) Chalcopyrite (C) Sphalerite (D) Galena

83. One of the following oxide minerals can be transluscent or transparent.

(A) Chromite (B) Pyrolusite (C) Wolframite (D) Cassiterite

84. Identify the odd type of ore deposit among the following, by considering the environment of ore formation.

(A) Banded iron formation
(B) Ferromanganese nodules
(C) Lateritic bauxite
(D) Phosphatic nodules

85. In the previous question, the odd type of ore deposit has formed in the following environment.

(A) Shallow marine
(B) Deep sea
(C) Lake
(D) Terrestrial

86. Ore deposits of one of the following metals is formed by magmatic process.

(A) Aluminium (B) Iron (C) Lead (D) Zinc

87. One of the following locations does not have a copper mines.

(A) Rakha
(B) Malanjkhand
(C) Kolihan
(D) Byrapur

88. The correct answer to previous question is a location where there is

(A) Lead-zinc mines
(B) Bauxite mines
(C) Chromite mines
(D) Iron ore mines

89. One of the following defines the cut-off grade of an ore.

(A) Minimum metal content of an ore
(B) Average metal content of an ore
(C) Minimum thickness of an ore body
(D) Average thickness of an ore body

90. In a lateritic bauxite deposit, the uppermost litho-unit is

(A) bauxite
(B) laterite
(C) lithomarge
(D) partially weathered bedrock

91. One of the following defines the hydrothermal ore forming process.

(A) Metals are transported and precipitated from carbonic fluid
(B) Metals are transported and precipitated from hot carbonic fluid
(C) Metals are transported and precipitated from aqueous fluid
(D) Metals are transported and precipitated from hot aqueous fluid

92. One of the following mineral deposits is not associated with granite pegmatites.

(A) chaleopyrite (B) cassiterite

(C) muscovite (D) beryl

93. One of the following represents the chemical composition of pyrrhotite.

(A) $Fe_{1-x}S$ (B) FeS_{1-x}

(C) $Fe_{1-x}S_2$ (D) Fe_2S_{1-x}

94. One of the following represents the chemical composition of magnetite.

(A) $Fe^{2+}Fe^{3+}{}_2O_4$ (B) $Fe^{3+}Fe^{2+}{}_2O_4$

(C) $Fe^{2+}Fe^{3+}O_3$ (D) $Fe^{3+}{}_2O_3$

95. The brand names Leica, Olympus, Nikon, Zeiss refer to manufacturers of

(A) Geological maps (B) Polarizing microscopes

(C) Spectrometers (D) Geological field kit

96. One of the following refers to Survey of India toposheet in 1:50000 scale.

(A) 57 (B) 57J

(C) 57J/12 (D) 57J/12/SW

97. The pocket lens used in geological field work has a magnification of

(A) 5x (B) 10x (C) 50x (D) 100x

98. Shield and craton refer to some parts of

(A) earth (B) earth crust

(C) continental crust (D) oceanic crust

99. One of the following is an example of mobile belt.

(A) Vindhyan basin (B) Deccan trap

(C) Himalaya (D) None of the above

100. One of the following minerals does not form placer deposit.

(A) magnetite (B) ilmenite (C) diamond (D) sphalerite