

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

M.Sc. (APPLIED GEOLOGY)

COURSE CODE : 367

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 367

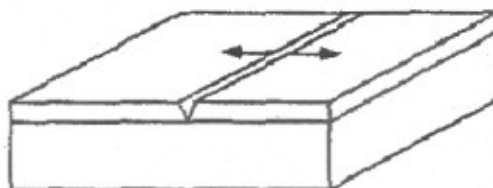
Time : 2 Hours

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 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.

- The layer that occurs in between crust and core is
(A) magma layer (B) lithosphere (C) mantle (D) continent
- New seafloor is created at a
(A) deep-sea trench (B) mid-ocean ridge
(C) subduction zone (D) transform fault
- The descent of oceanic lithosphere into the mantle is the process of
(A) accretion (B) subduction (C) obduction (D) collision
- The age of the Earth is currently considered as
(A) 6230 million years (B) 3800 million years
(C) 4560 million years (D) 5540 million years
- The lithosphere below stable continents is approximately kilometers thick.
(A) 30-40 (B) 60-70 (C) 100-150 (D) 200-250
- The tectonic feature illustrated in the figure below represents



- (A) transform fault (B) divergent plate boundary
(C) convergent plate boundary (D) thrust fault
- The continental crust is always at higher elevation than oceanic crust, because
(A) Continental crust is lower in density than Oceanic crust
(B) Continents have mountain ranges
(C) Oceanic crust forms at Mid oceanic ridges
(D) Continental crust is older compared to Oceanic crust
- Crystals belonging to which of the following crystal systems have mutually perpendicular but unequal crystallographic axes
(A) Cubic (B) Monoclinic (C) Orthorhombic (D) Triclinic
- Which of the following pairs of minerals is not an example of polymorphs?
(A) Kyanite and Andalusite (B) Calcite and Aragonite
(C) Quartz and tridymite (D) Diopside and Augite

10. Which one of the following choices contains minerals that do NOT show pleochroism?
- (A) Rutile, hypersthene and tourmaline
 - (B) Wollastonite, muscovite and tremolite
 - (C) Sphene, augite and epidote
 - (D) Staurolite, chlorite and glaucophane
11. Which of the following is not a mineral?
- (A) olivine (B) limestone (C) calcite (D) quartz
12. According to Plate Tectonics theory, most active volcanoes occur
- (A) in continents (B) in large tectonic plates
 - (C) along plate boundaries (D) in small tectonic plates
13. Megascopically identifiable quartz and potassium feldspar grains are the main constituents of
- (A) granite (B) gabbro (C) basalt (D) rhyolite
14. Which of the following minerals would crystallize early from a high-Mg basalt magma?
- (A) biotite (B) plagioclase (C) olivine (D) spinel
15. Flint, chert, and jasper are microcrystalline forms of
- (A) quartz (B) hematite (C) halite (D) calcite
16. Which of the following represents the longest time period?
- (A) Precambrian (B) Paleozoic (C) Mesozoic (D) Cenozoic
17. The Main Central Thrust separates
- (A) Higher Himalaya and Tethyan Himalaya
 - (B) Higher Himalaya from Lesser Himalaya
 - (C) Siwalik from Higher Himalaya
 - (D) Siwalik and Lesser Himalaya
18. Hot deserts lie between the latitude of
- (A) 5° and 15° (B) 20° and 30° (C) 30° and 45° (D) 50° and 65°
19. In the case of wind erosion, the base level of erosion will be
- (A) mean sea level (B) sea level (C) water table (D) lake level

20. Which type of coiling is rare in gastropoda?
 (A) dextral (B) sinistral (C) armestral (D) trochospiral
21. When did the Trilobite disappear from the Earth?
 (A) Devonian (B) Carboniferous
 (C) End of Permian (D) End of Cretaceous
22. Flat topped sea mounts are termed as
 (A) guyots (B) mesa (C) inselberg (D) monodnock
23. Dinosaurs are reported from the rocks of
 (A) Silurian (B) Devonian (C) Triassic (D) Permian
24. The drainage pattern which signifies an area lacking structural control is
 (A) radial (B) rectangular (C) dendritic (D) trellis
25. Find the odd one out.
 (A) Fusus (B) Conus (C) Oliva (D) Cardita
26. Which of the following rocks possess higher amount of primary porosity?
 (A) claystone (B) sandstone (C) limestone (D) siltstone
27. Inner planets differ from the outer planets of the solar system by having
 (A) a different direction of orbit
 (B) more rocky material than gaseous material
 (C) higher gravitational force
 (D) more number of natural satellites
28. Plate in 'plate-tectonics' theory means
 (A) fragment of continental crust (B) fragment of oceanic crust
 (C) fragment of lithosphere (D) a part of mountain range
29. More Tsunamis hit Japan because
 (A) Japan is in east where moon's tidal forces are maximum
 (B) Japan's sea coast is not protected by rocks
 (C) Japan is along an active plate boundary where more underwater earthquakes take place
 (D) Average elevation of Japan is low

30. Which of the following minerals has a framework silicate structure?
 (A) Feldspar (B) Mica (C) Olivine (D) Pyroxene
31. Which one of the following is not a silicate mineral?
 (A) Mica (B) Olivine (C) Galena (D) Hornblende
32. A granitic body intrudes into a sedimentary formation. Which of the following geological process would likely take place in such settings?
 (A) Sedimentary rocks would undergo thermal metamorphism along the contact of granitic intrusion
 (B) Granitic body would form a high mountain chain
 (C) Sedimentary rocks would get weathered faster
 (D) Intrusion would cause basaltic volcanism on surface
33. Volcanism is generally least along which of the following tectonic settings?
 (A) Subduction zone (B) Divergent plate boundary
 (C) Above plume head (D) Transform Faults
34. A statue made up of limestone is likely to weather faster in which of the following conditions?
 (A) Hot humid tropical climate (B) Cold arid climate
 (C) Arid climate at high altitude (D) Hot desert
35. Which of the following structures can help to determine the direction of current that deposited the rock?
 (A) Asymmetric ripple marks (B) Symmetric ripple marks
 (C) Mud cracks (D) Graded bedding
36. Which of the following rock types would have finest size particles?
 (A) Conglomerate (B) Sandstone (C) Mudstone (D) Greywacke
37. Stromatolite structures are related to
 (A) algae (B) fungi (C) diatom (D) foraminifera
38. Oldest rocks from India are reported from
 (A) Dharwar craton (B) Bastar craton
 (C) Aravalli craton (D) Eastern Ghats

39. Indian manganese and iron deposits are mostly found in
 (A) Hadean (B) Upper Proterozoic
 (C) Lower Proterozoic (D) Paleozoic
40. Choose correct sequence from the following
 (A) Blaini-Krol-Tal (B) Subathu-Kasauli-Dagshai
 (C) Tipam-Surma-Barail (D) Nari-Gaj-Kirthar
41. The main unconformity separating the Achaean and Proterozoic succession occurs at
 (A) 3200 Million years (B) 2700 Million years
 (C) 600 Million years (D) 2500 Million years
42. Which of the following is not a time rock unit?
 (A) System (B) Series (C) Epoch (D) Stage
43. The first fundamental generalization of stratigraphy is
 (A) Order of superposition (B) Principle of uniformitarianism
 (C) Stratigraphic analysis (D) Law of faunal succession
44. The first land plant appeared during
 (A) Cambrian (B) Ordovician
 (C) Silurian (D) Carboniferous
45. The shell of foraminifera are made up of
 (A) Calcium Carbonate (B) Arenaceous sediments
 (C) Chitin (D) Any of the above
46. The most favorable environment for the preservation of fossils is
 (A) Terrestrial (B) Lacustrine (C) Marine (D) Fluvial
47. Each coil in a shell of Gastropoda
 (A) Increase towards the base (B) Decrease towards the base
 (C) Increase towards the apex (D) Uniform throughout the shell
48. Lamellibranches with two unequal adductors are
 (A) Isomyaria (B) Aniosomyria (C) Monomyria (D) Dimyria

49. The bivalvia shells are jointed together at dorsal side by
 (A) Adductor muscle (B) Hinge plate
 (C) Ligament (D) Delthyrium
50. Megalodon belongs to phylum
 (A) Brachiopod (B) Pelecypod (C) Gastropod (D) Cephalopod
51. Which of the following is not matched correctly?
 (A) Planorbis - Brachiopoda (B) Montivaltia - Coral
 (C) Physa - Gastropoda (D) Anisomyon - Gastropoda
52. Flat topped hill or small mountains formed by stream action are called
 (A) Mesas (B) Buttes (C) Cuestas (D) River terrace
53. Natural levee is an example of
 (A) Channel fill deposit (B) Point bar deposit
 (C) Flood plain deposit (D) Braid bar deposit
54. Streams that flow in the same direction as the original consequent but at a lower topographic level are known as
 (A) Obsequent (B) Subsequent (C) Insequent (D) Resequent
55. Loess is an un-stratified, well-sorted Aeolian deposit composed of
 (A) clay and silt (B) sand and silt (C) only silt (D) only clay
56. Shale refers to a rock formed from
 (A) sand sized material (B) plant remains
 (C) clay minerals (D) carbonate
57. The tendency for variations in current velocity to segregate sediments on the basis of particle size is called
 (A) lithification (B) compaction (C) metamorphism (D) sorting
58. 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

59. 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
60. A feldspar-rich sandstone is called
(A) arkose (B) litharenite (C) quartz arenite (D) shale
61. Which of the following lists is written in the order of increasing temperature?
(A) sedimentation, metamorphism, diagenesis
(B) diagenesis, sedimentation, metamorphism
(C) sedimentation, diagenesis, metamorphism
(D) metamorphism, diagenesis, sedimentation
62. In which of the following sedimentary environments would you least expect to find gravel?
(A) active margin beach (B) alluvial fans
(C) glacial (D) deep marine
63. What is the most abundant biochemical precipitate in the oceans?
(A) halite (B) limestone (C) chert (D) coal
64. Which type of weathering works most effectively on limestone?
(A) Dissolution (B) Frost wedging (C) Hydrolysis (D) Oxidation
65. What are the two most abundant elements in the Earth's crust?
(A) iron and magnesium (B) oxygen and silicon
(C) silicon and aluminium (D) silicon and calcium
66. Select sequence of minerals according to increasing melting point.
(A) Quartz, Forsterite, Fayalite (B) hornblende, Fayalite, Forsterite
(C) Fayalite, Forsterite, diopside (D) Forsterite, Fayalite, Quartz
67. Dip direction of the vertical bed whose strike is northeast-southwest is
(A) Towards northwest (B) Towards southeast
(C) Towards northeast (D) Not defined

68. While moving away from the mid oceanic ridge, the age of the mid oceanic ridge basalt
- (A) Decreases (B) Increases
(C) Remains constant (D) Fluctuates
69. Which one of the following represents increasing order of metamorphism?
- (A) Slate, phyllite, schist, gneiss (B) Slate, schist, phyllite, gneiss
(C) Phyllite, slate, schist, gneiss (D) Phyllite, schist, slate, gneiss
70. Which one of the following minerals will not leave a streak on streak plate?
- (A) Magnetite (B) Talc (C) Calcite (D) Topaz
71. Presence of gypsum in a rock indicates following conditions during its formation
- (A) High precipitation (B) Evaporative condition
(C) Humid condition (D) Cold condition
72. The Earth's upper mantle is essentially made up of
- (A) Olivine and pyroxene (B) Olivine and muscovite
(C) Quartz and feldspar (D) Pyroxene and garnet
73. Which one of the following statement about the petrological microscope is true?
- (A) A circular stage and a polarizer are present
(B) Two polarizers, one above and another below the circular stage are present
(C) Both the polarizers are fitted below the circular stage
(D) Both the polarizers are fitted above the circular stage

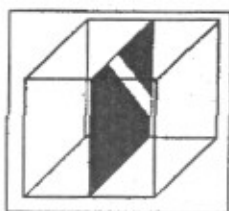
Study the figure below and answer the following four questions.



74. The c-axis of this crystal coincides with _____ fold axis.
- (A) 3 (B) 4 (C) 6 (D) 8

75. Which one of the following statement is true about this crystal?
- (A) The crystal has two a-axes intersecting at 90°
 - (B) The crystal has three a-axes intersecting at 120°
 - (C) The crystal has three a-axes intersecting at 60°
 - (D) The crystal has an a-axis, b-axis and c-axis, all mutually perpendicular
76. Does this crystal have a center of symmetry and mirror plane symmetry?
- (A) Center of symmetry only
 - (B) Mirror planes only
 - (C) Neither center of symmetry nor mirror plane
 - (D) Both center of symmetry and mirror planes
77. This crystal belongs to _____ crystal system.
- (A) cubic
 - (B) hexagonal
 - (C) tetragonal
 - (D) orthorhombic
78. Spinel group of minerals are classified as
- (A) oxides
 - (B) carbonates
 - (C) island silicates
 - (D) framework silicates
79. Rock formed by consolidation of fine volcanic ash is known as
- (A) obsidian
 - (B) tephra
 - (C) rhyolite
 - (D) tuff
80. Vesicles found in some volcanic rocks are formed due to
- (A) separation of gasses from magma
 - (B) sudden cooling of magma on contact with water
 - (C) sudden cooling of magma on contact with atmosphere
 - (D) preferential weathering and removal of phenocrysts
81. Volcanoes along the mid-ocean ridges predominantly erupt lavas of _____ type.
- (A) andesite
 - (B) basalt
 - (C) dacite
 - (D) trachyte
82. The tilt of the Earth's rotation axis with reference to perpendicular of the orbital plane is
- (A) 12.5°
 - (B) 23.5°
 - (C) 30°
 - (D) 45°
83. The assemblage 'Sapphirine + Quartz' is indicative of metamorphism at
- (A) high pressure
 - (B) high temperature
 - (C) ultra-high temperature
 - (D) ultra-high pressure

84. At an invariant point ϕ (number of phase component) is equal to
 (A) C (B) C + 3 (C) C + 2 (D) C + 1
 where C is the number of system component.
85. The reaction $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$ (talc) + 4MgSiO_3 (enstatite) = $\text{Mg}_2\text{Si}_8\text{O}_{22}(\text{OH})_2$ (anthophyllite) is a type of
 (A) devolatilization reaction
 (B) ion-exchange reaction
 (C) solid-solid net-transfer reaction
 (D) polymorphic transformation reaction
86. If the pitch of a linear structure on a bed of attitude N 30°E/50° SE is 90°, then the plunge of the linear structure will be
 (A) 30° (B) 45° (C) 50° (D) 90°
87. In the diagram, the orientation of the axial planar cleavage (dark plane) and pitch of the bedding (white band) trace on the cleavage is given. The pattern is characteristic of



- (A) upright horizontal fold (B) upright plunging fold
 (C) inclined horizontal fold (D) inclined plunging fold
88. Nickel sulfide ore deposits are examples of
 (A) early magmatic deposit (B) late magmatic deposit
 (C) contact metamorphic deposit (D) residual sedimentary deposit
89. Which of the following is the example of Residual sedimentary ore deposit?
 (A) Chromite (B) Gold
 (C) Banded Iron Formation (D) Bauxite
90. Gossans are indicative of mineral occurrences. They are formed due to
 (A) contact metamorphism because of magma intrusion
 (B) hydrothermal alteration of country rock
 (C) intensely oxidized, weathered or decomposed rock of an ore deposit
 (D) sedimentary exhalative processes

91. Gold deposits are NOT associated with one of the following
 - (A) Quartz lode
 - (B) Banded iron formation
 - (C) Conglomerate
 - (D) Shale
92. Which one of the following sulphide minerals can be translucent or transparent?
 - (A) Pyrite
 - (B) Chalcopyrite
 - (C) Sphalerite
 - (D) Galena
93. Which one of the following oxide minerals can be translucent or transparent?
 - (A) Chromite
 - (B) Pyrolusite
 - (C) Wolframite
 - (D) Cassiterite
94. Which one of the following represents the chemical composition of pyrrhotite?
 - (A) Fe_{1-x}S
 - (B) FeS_{1-x}
 - (C) $\text{Fe}_{1-x}\text{S}_2$
 - (D) $\text{Fe}_2\text{S}_{1-x}$
95. Which one of the following represents the chemical composition of magnetite?
 - (A) $\text{Fe}^{2+}\text{Fe}^{3+}_2\text{O}_4$
 - (B) $\text{Fe}^{3+}\text{Fe}^{2+}_2\text{O}_4$
 - (C) $\text{Fe}^{2+}\text{Fe}^{3+}\text{O}_3$
 - (D) $\text{Fe}^{3+}_2\text{O}_3$
96. 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
97. One of the following locations does NOT have a copper mines.
 - (A) Rakha
 - (B) Malanjkhand
 - (C) Kolihan
 - (D) Byrapur
98. 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
99. In a lateritic bauxite deposit, the uppermost litho-unit is
 - (A) bauxite
 - (B) laterite
 - (C) lithomarge
 - (D) partially weathered bedrock
100. 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