

Delhi University
M.Sc. Geology—Postgraduate Entrance Test, 2014
Date of Exam: 19th June, 2014
Do not open test booklet until you are asked to do so

Test Booklet Serial No -----

Total Number of Pages: 22

Time Allowed: 3 hours

Number of Questions Section in ‘A’: 100

Maximum Marks: 250

Number of questions in Section ‘B’: 10

Please fill in the following information:

Name of the Candidate -----

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Candidate’s Signature----- Invigilator’s Signature-----

Important Instructions:

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2. **There are two sections of the question paper. Section ‘A’ consists of 100 multiple choice questions. Mark the correct answer by pen in the box provided against the question numbers on Page 1. Section ‘B’ consists of 10 questions requiring short and precise answers to be written within the space provided below the question.**
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5. **Each correct answer in Section ‘A’ will get 2 marks. Each incorrect answer will have negative (-1/2) mark. In Section ‘B’ each question carries maximum 05 (Five) marks. There is no negative mark for Section ‘B’.**
6. There will be no negative marking for unattempted questions.
7. Any observation on the test including questions and answers (options) if any, should be sent to the controller of the examination, examination branch within 24 hours after the test.
8. Observation(s) received after the said period will not be entertained.
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10. The answer key of the Multiple choice question will be uploaded at the www.du.ac.in after 24 hours from the conclusion of the entrance examination. The candidate is required to visit the website to check the answer key vis a vis the question paper and can register any complaint within 48 hours from the time of uploading of the answer key. The complaints can be sent to The Head, Department of Geology, Delhi University on the official email hodgeoldu@gmail.com.

Section 'A'

01. In view of relative susceptibility to chemical weathering, which of the following is the correct sequence of increasing stability?
- Albite – Forsterite – Muscovite – Kaolinite
 - Muscovite – Enstatite – Nepheline – Wollastonite
 - Forsterite – Diopside – Microcline – Quartz
 - Microcline – Gibbsite – Diopside – Anorthosite
02. Which of the following climate regimes will have the deepest weathering profile?
- Tundra regions
 - Steppes
 - Desserts
 - Tropical rainforests
03. During weathering of silicate minerals, incorporation of cations from mineral into organic compounds is related to :
- Carbonation
 - Hydrolysis
 - Chelation
 - Hydration
04. Mass wasting related to barely perceptible and non-accelerating downslope movement is called as:
- Earth flow
 - Creep
 - Rock Topple
 - Rock Fall
05. Which of the following hill slope component is related to pedogenic process?
- Colluvial Foot Slope
 - Fall face
 - Convex creep slope
 - Interfluve
06. Shallow igneous Plano-convex lens shaped bodies are called as:
- Batholith
 - Lopolith
 - Laccoliths
 - Tropical Domes
07. Which of the following volcanic landform is the largest in size?
- Craters
 - Tephra cones
 - Plug domes
 - Strato volcanoes

08. Which of the following volcanic activity is related to little or no explosive activity?
- Rhyolitic
 - Dacitic
 - Andesitic
 - Basaltic
09. Metamorphic rock that forms under high pressure and low to moderate temperature in subduction zones are called?
- Granulites
 - Skarns
 - Blueschists
 - Amphibolites
10. Which of the following minerals crystallizes first from a silicate melt
- Diopside
 - Enstatite
 - Quartz
 - Hornblende
11. A Mid Oceanic Ridge is characterized by?
- Normal fault, shallow earthquake and low-K tholeiitic lava
 - Reverse fault, shallow earthquake and low-K tholeiitic lava
 - Reverse fault, deep earthquake and alkaline lava
 - Normal fault, shallow earthquake and andesitic lava
12. The unconformity that marks end of rift sedimentation phase in Bombay high belongs to:
- Early to middle Miocene
 - Middle Oligocene
 - Middle to late Paleocene
 - Late Miocene
13. Aseismic ridges are associated with:
- Hotspots
 - Subduction zones
 - Cratons
 - Island arcs
14. A Silicate mineral will remain dark on full rotation of microscope stage under cross-nicol if
- The mineral crystallized in orthorhombic system
 - The mineral section is cut parallel to optic axis
 - The mineral section is cut perpendicular to optic axis
 - The mineral crystallized in triclinic system

15. Lithosphere subjected to local and regional loads react by phenomenon that is known as:
 - a. Rifting
 - b. Subduction
 - c. Obduction
 - d. Flexure

16. The stratigraphic equivalent of Salkhala and Jutogh Groups of western Himalaya in eastern Himalaya is:
 - a. Darjeeling Gneisses
 - b. Daling Group
 - c. Tejam Group
 - d. Kurnool Group

17. The Principle of Uniformitarianism was given by
 - a. James Hutton
 - b. Nicholas Steno
 - c. William Smeeth
 - d. Walther

18. The two most abundant elements in Earth's crust are:
 - a. Iron and Magnesium
 - b. Aluminium and Oxygen
 - c. Oxygen and Silicon
 - d. Silicon and Aluminium

19. Which of the following cannot be used for determining sediment provenance?
 - a. Geochemistry of sediments
 - b. Thickness of sediment column
 - c. Grain size of sediment
 - d. Sorting of sediment

20. In resistivity survey the lowest resistivity can be expected from:
 - a. A sandstone with freshwater in pore space
 - b. A sandstone with oil in pore space
 - c. A sandstone with seawater in pore space
 - d. Well cemented sandstone

21. Sea water is saline because:
 - a. Na^+ and Cl^- are most abundant cation and anion in seawater.
 - b. Na^{+2} is abundant but Cl^- is less abundant.
 - c. Ca^{+2} is less abundant in sea water than Na^{+2}
 - d. Na^{+2} has higher residency time compared to Ca^{+2}

22. From Visser plot of grain size distribution we infer about:
- Mode of transport of sediments
 - Sorting of sediments
 - Skewness of sediments
 - Spread of sediment size
23. A conglomerate in which long axis (a) of pebbles is oriented perpendicular to direction of flow and intermediate axis (b) sloping in upcurrent direction can be inferred as product of:
- Mass flow
 - Lag deposit
 - Bed load deposit
 - Scree deposit
24. We differentiate an arkose from a granite on the basis of:
- Mineralogy
 - Geochemistry
 - Grain size
 - Texture
25. $\delta^{18}\text{O}$ value of foraminiferal carbonate :
- will remain same during interglacial & glacial stage
 - will increase during glacial stage
 - will increase during interglacial stage
 - will decrease during glacial stage
26. Water table is found at the top of the
- Zone of alteration
 - Zone of recharge
 - Zone of discharge
 - Zone of saturation
27. Antiperthite is a lamellar intergrowth of:
- Sodic plagioclase feldspar within K-feldspar
 - K-feldspar within sodic plagioclase
 - K feldspar within calcic plagioclase
 - Calcic plagioclase within sodic plagioclase
28. Obsidian is a:
- Silica rich glassy volcanic rock
 - Silica deficient volcanic rock
 - Mafic plutonic rock
 - Basic hypabyssal rock

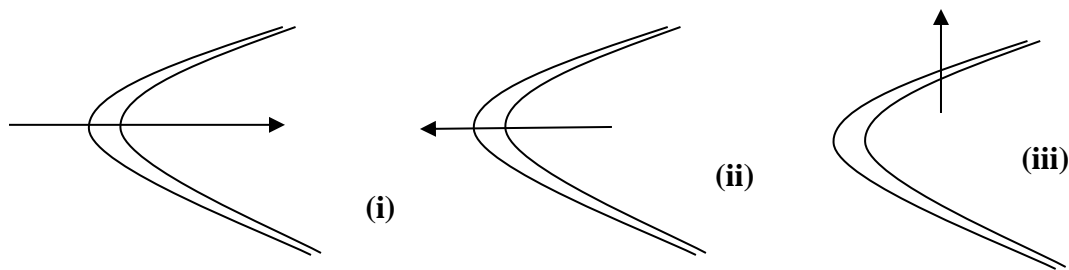
29. A rock made up of very finely crushed mineral grains is called as
 a. Breccias
 b. Gouge
 c. Cataclastic
 d. Mylonite

30. Most of the craters on moon surface are probably the result of
 a. Volcanic action
 b. Meteoroid bombardment
 c. Erosion
 d. Deposition

31. Which of the following character is typical of a transform fault?
 a. Fault displacement remains same along its length
 b. Fault displacement increases from one end to other end
 c. Fault displacement is maximum at the central part
 d. Fault displacement is minimum at the central part

32. Slickenside lineation on a fault surface indicates.
 a. Direction of net slip of the fault
 b. Direction of throw of the fault
 c. Direction of heave of the fault
 d. Direction of dip of the fault

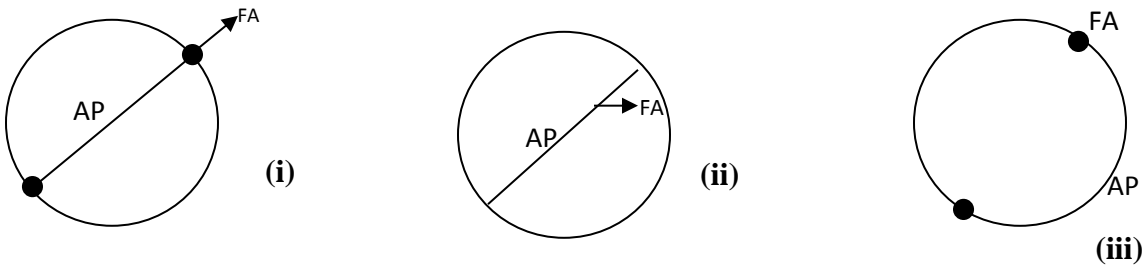
33. Identify the folds from the outcrop patterns shown below in diagram:



- a. (i)Plunging fold, (ii)Plunging synform, (iii) fault
- b. (i) plunging synform, (ii) plunging antiform, (iii) reclinant
- c. (i) non plunging synform, (ii) non plunging antiform, (iii) reclinant
- d. (i) Recumbent, (ii) reclinant, (iii) plunging antiform.

34. In a fold, the thickness of the folded layer measured perpendicular to its length remains same everywhere. Such fold is called:
 a. Parallel fold
 b. Supratenuous fold
 c. Cuspate lobate fold
 d. Similar fold

35. An unconformity in which sedimentary rocks overlies a plutonic igneous rock body is called:
- A discontinuity
 - A non conformity
 - A para conformity
 - An angular unconformity
36. In the overturned limb of a fold, which of the following is generally true?
- Dip of bedding is more than dip of cleavage
 - Dip of cleavage is more than dip of bedding
 - Dip of cleavage and bedding are same
 - Dip of cleavage and bedding cannot be compared.
37. According to Anderson's theory of faulting the Earth's surface is taken as:
- A surface with no shear stress
 - A surface with no normal stress
 - A surface with equal normal and shear stress
 - A surface with maximum shear stress.
38. Identify the type of folds from the given stereographic projections diagrams:



FA = Fold axis, AP = Axial Plane

- (i) Recumbent; (ii) inclined; (iii) upright non-plunging
 - (i) Upright, non-plunging; (ii) upright plunging; (iii) recumbent
 - (i) Neutral; (ii) reclined; (iii) recumbent
 - (i) Reclined; (ii) upright non-plunging; (iii) recumbent.
39. Polymorphic transformations represent _____ type of reactions:
- Continuous
 - Discontinuous
 - Dehydration
 - Decarbonation

40. The difference between orthorhombic and monoclinic crystal is:
- All crystallographic axes are unequal in orthorhombic and two axes are equal in monoclinic
 - All crystallographic axes are unequal in both and inter axial angles are 90 degrees.
 - All crystallographic axes are unequal in both and all inter-axial angles are 90 degree in orthorhombic and one angle is not equal to 90 degree in monoclinic.
 - All crystallographic axes are unequal in both and all inter axial angles are 90 degree in monoclinic and one angle is not equal to 90 degree in orthorhombic.
41. Symplectite texture is commonly inferred as an indicator of:
- Burial
 - Decompression
 - Contact metamorphism
 - Cataclasis
42. In AFM diagrams projected through muscovite, A is computed as:
- Al_2O_3
 - $(\text{Al}_2\text{O}_3 - 3\text{K}_2\text{O}) / (\text{Al}_2\text{O}_3 - 3\text{K}_2\text{O} + \text{FeO} + \text{MgO})$
 - $(\text{Al}_2\text{O}_3 - \text{K}_2\text{O}) / (\text{Al}_2\text{O}_3 - 3\text{K}_2\text{O} + \text{FeO} + \text{MgO})$
 - $\text{Al}_2\text{O}_3 / (\text{FeO} + \text{MgO})$
43. A Barrovian metamorphic sequence represents:
- Intermediate pressure facies
 - Low pressure facies
 - High pressure facies
 - Contact metamorphism
44. A mafic rock metamorphosed into a garnetiferous amphibolite indicates:
- Mg enriched mafic protolith
 - Fe enriched mafic protolith
 - Al enriched mafic protolith
 - Ca enriched mafic protolith
45. A reaction isograd in ACF diagram will be reflected as:
- Rotated tie line
 - Tie line flip
 - Change of slope of tie line
 - None of the above
46. In a three component system the maximum number of phases at invariance will be
- 3
 - 4
 - 5
 - 6

47. Graphic texture signifies:
- Peritectic crystallization
 - Eutectic crystallization
 - Fractional crystallization
 - Partial melting
48. A pinacoid is made up of _____ faces:
- 1
 - 2
 - 3
 - 4
49. Isotropic crystals have _____ optic axes
- 0
 - 1
 - 2
 - Infinite
50. Major Iron ore deposits of the world belongs to
- Phanerozoic
 - Cenozoic
 - Neoproterozoic
 - Paleoproterozoic and Archean
51. Archean greenstone belts are associated with economic deposits of
- Gold
 - Phosphorus
 - Lead
 - Rare earth elements
52. Spinel + Quartz = Corundum + _____
- Garnet
 - Sillimanite
 - Ilmenite
 - plagioclase
53. There are _____ lattices, _____ classes and _____ space groups
- 14,32,230
 - 32,14,230
 - 230,14,32
 - 14,230,32
54. In paired metamorphic belts high pressure metamorphic belt is located:
- At the mid oceanic ridges
 - Towards continental plate side
 - Towards oceanic plate side
 - In obduction zone

55. Identify the correct sequence in ascending order of metamorphism:
- Biotite, chlorite, kyanite, garnet
 - Chlorite,biotite, garnet, kyanite
 - Chlorite, garnet, biotite, kyanite
 - Chlorite, biotite, kyanite, garnet.
56. Which of the following facies is not present in low pressure metamorphic series?
- Green schist facies.
 - Amphibolites facies
 - Epidote amphibolite facies
 - Granulitic facies
57. Metasomatism represents
- Closed system
 - Open system
 - Isolated system
 - Adiabatic system
58. India's largest aluminium deposits are associated with
- Gondawana Supergroup
 - Eastern Ghats mobile belt
 - Lesser Himalayas
 - Mahakoshal group
59. World's major platinum group of element (PGE) deposits located in:
- Australia
 - South Africa
 - United states of America
 - Ethiopia
60. Unusually large traces of rare element iridium (Ir) are found in sediments deposited at the end of
- Cenozoic
 - Mesozoic
 - Cambrian
 - Jurassic
61. Which of the following stratigraphic unit underwent major age revision?
- Siwalik Supergroup
 - Dharwar Supergroup
 - Krol Group
 - Singbhum Group

62. Standard subdivision of each interval of geological time scale is based on some group of fossils. Which of the following fossil groups form the basis of subdivision of Mesozoic?
- Graptolites
 - Gastropods
 - Ammonites
 - Trilobites
63. Out of the following which has maximum salinity?
- Atlantic ocean
 - Pacific ocean
 - Indian ocean
 - Southern ocean
64. Which of the following is associated with ancient suture zones:
- Conglomerate
 - Foraminiferal ooze
 - Radiolarian chert
 - Sandstone
65. Which of the following symmetry elements is not present in any crystal system?
- Axis of 3 fold symmetry
 - Axis of 5 fold symmetry
 - Axis of 4 fold symmetry
 - Axis of 6 fold symmetry
66. Caledonian Orogeny occurred during
- Tertiary
 - Jurassic
 - Early Palaeozoic
 - Cretaceous
67. Which of the following stratigraphic boundaries is **not defined** on paleontological criterion?
- Permian-Triassic boundary
 - Miocene-Pliocene boundary
 - Pleistocene-Holocene boundary
 - Cretaceous-Tertiary boundary
68. Which of the following is not a chronostratigraphic unit?
- System
 - Erathem
 - Formation
 - Series

69. Which of the following is correct sequence of lithostratigraphic units in Siwalik super group in ascending stratigraphic order?
- Kamalia Formation, Chinji Formation, Nagri Formation, Dhok Pathan Formation, Tatrot Formation, Pinjor Formation.
 - Chinji Formation, Tatrot Formation, Kamalia Formation, Pinjor Formation, Nagri Formation
 - Tatrot Formation, Kamalia Formation, Pinjor Formation, Nagri Formation, Dhok Pathan Formation.
 - Pinjor Formation, Dhok Pathan Formation, Kamalia Formation, Nagri Formation, Tatrot Formation.
70. First vertebrate (Fish) appeared in:
- Triassic
 - Ordovician
 - Cretaceous
 - Permian
71. Taphonomy is the study of
- Environmental processes when the specimen was living
 - Post mortem (post-depositional) processes, that influenced the specimen
 - Chemical composition of the fossils
 - Internal structure of the fossils
72. The deposition of suspended and dissolved material in a soil profile is referred as:
- Eluviation
 - Illuviation
 - Humus
 - Leaching
73. Which of the following is an example of ichnofossil?
- Fossilized Serpent trail
 - Fossilized Brachiopod shell
 - Fossilized Elephant tusk
 - None of the above
74. Trilobite fossils are recovered from the rocks ranging in age from
- Pliocene to Pleistocene
 - Triassic to Jurassic
 - Cambrian to Permian
 - Pleistocene to Holocene

75. Brachiopods have

- a. Equivalves and inequilateral shell
- b. Unequal valves and equilateral shell
- c. Radially symmetric shell
- d. None of the above

76. Ichthyostega represents the evolutionary stage between

- a. Reptiles and mammals
- b. Fish and amphibians
- c. Invertebrates and vertebrates
- d. Amphibians and reptiles

77. Which one of the following fossil groups has a property of ecdysis?

- a. Trilobites
- b. Brachiopods
- c. Foraminifera
- d. Connecting organs

78. Past seawater temperature can be reconstructed from the

- a. Oxygen isotopic composition of the calcareous foraminifera
- b. Carbon isotopic composition of the calcareous foraminifera
- c. Carbon isotopic composition agglutinated foraminifera
- d. Oxygen isotopic composition of agglutinated foraminifera

79. Economic deposit of Uranium is most likely to be found in

- a. Gabbro
- b. Rhyolite
- c. Sandstone
- d. Peridotite

80. Becke Line, appears to move

- a. Into the mineral with the higher refractive index as the objective of the microscope is raised
- b. Away from the mineral with the higher refractive index as the objective of the microscope is raised
- c. Into the mineral with the higher refractive index as the objective of the microscope is lowered
- d. Into the mineral with the lower refractive index as the objective of the microscope is raised

81. Which of the following is contact metamorphic facies

- a. Zeolite facies
- b. Sanidinite facies
- c. Granulite facies
- d. Greenschist facies

82. Which of the following is a mechanically strained rock

- a. Marble
- b. Mylonite
- c. Granulite
- d. Hornfels

83. Melting points of minerals

- a. Increase with pressure
- b. Decrease with pressure
- c. Do not change with change in pressure
- d. Increases with increase in water content

84. Silicon: Oxygen ratio is highest in

- a. Tectosilicates
- b. Inosilicates
- c. Nesosilicates
- d. Sorosilicates

85. Laterites are

- a. Weathering product rich in Pb and Mn hydroxides
- b. Weathering products rich in Fe and Al hydroxides
- c. Cooling product of magma rich in Fe and Al sulphides
- d. Result from high pressure metamorphism of granite.

86. Capillary fringe

- a. overlies the true water table
- b. underlies the true water table
- c. may occur above or under the water table
- d. None of the above

87. Presence of volcanic glass of terrestrial origin, in marine sediments, is an example of

- a. Autochthonous component
- b. Allochthonous component
- c. Piedmont component
- d. Primary component

88. Which of the following is an erosional landform made by glaciers?

- a) Moraine
- b) Eskers
- c) Cirque
- d) Kame

89. Hydraulic action, solution, and abrasion are all examples of:

- a) Stream erosion
- b) Stream deposition
- c) Transportation
- d) Stream discharge

90. The most voluminous portion of the Earth is known to geologists as:

- a) The crust
- b) The mantle
- c) The core
- d) The lithosphere

91. Rate of Indian plate motion at present is

- a) 3 - 4 centimeters per year
- b) 1 - 18 centimeters per year.
- c) 1 kilometer per year
- d) 1,000 kilometers per year

92. A sedimentary bedding dips 40° towards $N45^\circ W$. Its apparent dip towards $N10^\circ W$ will be around:

- a) 25°
- b) 45°
- c) 60°
- d) 80°

93. A positive gravity anomaly indicates:

- a) An excess of mass.
- b) A deficiency in mass.
- c) A reversal of the gravitational field.
- d) None of these.

94. Which of the following is characteristic of a tsunami?

- a) Very long wavelength.
- b) Very fast moving wave.
- c) Very low wave amplitude in the open ocean.
- d) All of the above.

95. The oldest seafloor on Earth is not more than:

- a) 200 million years old.
- b) 2 billion years old.
- c) 20 million years old.
- d) 2 million years old.

96. The continental rise is:

- a) A wedge of sediment at the base of the continental slope.
- b) An uplifted portion of the continent
- c) A portion of the mid-ocean ridge.
- d) A flat-topped seamount.

97. In high grade rocks of granulite facies where muscovite is unstable, sillimanite coexists with

- a) Na-feldspar
- b) K-feldspar
- c) Plagioclase
- d) Quartz

98. If CL and VL represent channel length and valley length of a stream then the sinuosity of the channel is expressed by

- a) $CL + VL$
- b) $CL \times VL$
- c) CL / VL
- d) $VL - CL$

99. The relationship between annual frequency (N) and magnitude (M_s) of earthquake is expressed as

- a) $\log N = a + bM_s$
- b) $\log N = a - bM_s$
- c) $N = a \times M_s$
- d) $N = a \times bM_s$

100. Low velocity layer (LVL) within the Earth coincides with depth range of

- a. 50-100 Km
- b. 300- 350 Km
- c. 600-750 Km
- d. 100-200 Km