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120 MINUTES

1. The earliest known calcareous-walled foraminifera are the:
A) Fusulinids B) Spirillinids C) Involutinids D) Lagenids
2. A set of fossils brought together after death by sedimentary processes, rather than by virtue of having originally lived there collectively:
A) Biocoenosis B) Cyanosis
C) Hiatoconosis D) Thanatocoenosis
3. Which of the following is correct regarding the matching of the Carbonaceous Chondrites (CC) Groups with their typical examples?
A) CO – Alais; CV – Murchison; CI – Kaidun; CM – Kainaz
B) CO – Alais; CV – Kainaz; CI – Kaidun; CM – Allende
C) CO – Kaidun; CV – Allende; CI – Murchison; CM – Kainaz
D) CO – Kainaz; CV – Allende; CI – Alais; CM – Kaidun
4. The most economical and feasible type of dam that can be best placed in a narrow canyon with steep rock sides:
A) Buttress Dam B) Gravity Dam C) Arch dam D) Coffer Dam
5. The westerly side of the Indian Plate is a transform boundary with Arabian Plate, is called:
A) Central Indian Ridge B) Carlsberg Ridge
C) Owen Fracture Zone D) Sunda Trench
6. Very closely spaced, parallel joints and fractures in rocks result in ----- cleavage.
A) Fracture B) Crenulation C) Strain Slip D) Shear
7. The Concept of Land Bridge Theory was first proposed by:
A) Jules Marcou B) Ignatz Venetz
C) Clarence Dutton D) Alfred Wegener
8. Match the Wentworth Sediment Grain Sizes with the corresponding Krumbein Phi (Φ) Scales.
List I- Wentworth Sediment Grain Size List II - Krumbein Phi (Φ) Scale

a. 2 to 64	1. -6 to -8
b. $1/256$ to $1/16$	2. 4 to 8
c. $1/16$ to 2	3. -1 to 4
d. 64 to 256	4. -1 to -6

A) a-3, b-4, c-1, d-2	B) a-4, b-2, c-1, d-3
C) a-2, b-4, c-3, d-1	D) a-4, b-2, c-3, d-1

9. The United Nations Framework Classification (UNFC) for energy and mineral resources consists of a ----- system.
- A) Two-dimensional B) Three-dimensional
C) Multidimensional D) One-dimensional
10. The metamorphic rock formed by the contact between mudstone / shale or clay rich rock and a hot igneous body:
- A) Phyllite B) Hornfels C) Slate D) Amphibolite
11. Chromium and titanium ores are examples of----- respectively.
- A) Metasomatic and Hydrothermal deposits
B) Dissemination and Injection deposits
C) Late and Early segregations
D) Early and Late segregations
12. The largest and most rapid global sea level rise event of the last deglaciation, characterized by ~20 m global mean sea level rise within 500 years.
- A) Meltwater Pulse 2 B) Meltwater Pulse 1A
C) Meltwater Pulse 1D D) Meltwater Pulse 1C
13. The ‘Binary Star Hypothesis’ on the origin of Solar System was propounded by:
- A) H. N. Russell in 1937 B) C. F. Weizacker in 1944
C) Otto Schmidt in 1944 D) Jeans and Jeffreys in 1918
14. In an artesian well condition the piezometric surface will:
- A) be within the aquifer B) coincide with the local water table
C) be above the ground surface D) occur below the aquifer
15. ---- logging is the electrical well logging method highly useful to delineate clay dominated saline water zones.
- A) Resistivity B) S. P. C) Sonic D) Caliper
16. Which of the following statements is incorrect?
- A) Rhyolites have more than 66% SiO₂ content and are classified as acid igneous rocks.
B) The IUGS classification of Igneous rocks is strictly a quantitative mineralogical classification.
C) The most popular chemical classification scheme of Igneous rocks is Total Alkali Silica (TAS) classification.
D) The CIPW classification is based on the alumina saturation.
17. The simplest vector data structure in GIS is ----- data model.
- A) Topological B) Discrete
C) Spaghetti D) Hybrid topological

18. ----- method is the artificial groundwater recharge method most suited for areas with irregular topography.
- A) Flooding
B) Basin or Percolative Tank
C) Ditch and Furrow
D) Recharge Pits and Shafts

19. Choose the correct statements from the following:
1. Greenhouse gases cause greenhouse effect by absorbing infrared radiations and release heat in all directions.
 2. Carbon monoxide and Nitrogen dioxide are harmful greenhouse gases.
 3. The global warming impact of methane is 25 times greater than that of carbon dioxide over a 100-year period.
 4. In global warming temperature of the Stratosphere increases.
- A) 2 only B) 1 and 4 only C) 4 only D) 1 and 3 only

20. Stratigraphic units taken at random from the Triassic succession of Spiti are given below.
- a) Daonella Limestone b) Nodular Limestone c) Otoceras Zone
d) Monotis Shale e) Megalodon Limestone

The correct hierarchical order of these units according to their stratigraphic position from the oldest to the youngest is:

- A) d → a → e → c → b B) c → b → a → d → e
C) b → e → d → c → a D) e → a → d → c → b
21. Match the theories/concepts of geomorphology in List-I with their related geomorphologists / geologists in List-II
- | <u>List I</u> | <u>List II</u> |
|--|-------------------------|
| a. Theory of Slope Replacement | 1. Alan Wood |
| b. Concept of Geographic cycles | 2. Lester Charles King |
| c. Theory of Parallel Slope Retreat | 3. Walther Penck |
| d. Elements of Slope and Slope evolution | 4. William Morris Davis |
- A) a-4, b-3, c-2, d-1 B) a-4, b-1, c-3, d-2
C) a-3, b-4, c-2, d-1 D) a-3, b-4, c-1, d-2

22. ----- Sequence Boundary is the type of sequence boundary formed when the rate of sea level fall exceeds the rate of subsidence at the depositional shoreline break.
- A) Type-2 B) Type-1 C) Para D) Type-3

23. The symmetry: 3 axial axes of 4-fold symmetry; 4 diagonal axes of 3-fold symmetry; 6 diagonal axes of 2-fold symmetry; 3 axial planes; 6 diagonal planes; Centre of symmetry – present, is characteristic of
- A) Normal Class – Hexagonal System
B) Normal Class – Orthorhombic System
C) Normal Class – Cubic System
D) Normal Class – Monoclinic System

24. ----- is a Kimberlitic indicator mineral.
 A) Plagioclase feldspar B) Pyrochlore
 C) Chromium diopside D) Magnesian monazite
25. ----- law is the law which states that the distance to a galaxy is proportional to its recession velocity.
 A) Newton's B) Kirchoff's C) Kepler's D) Hubble's
26. The Thematic Mapper used in the Landsat mission is a ----- Scanner.
 A) Whiskbroom B) Pushbroom
 C) Hyperspectral D) Along-track
27. Match the important Gondwana Coal Fields of India in List-I with the states of occurrence in List-II.
- | | |
|------------------------|-------------------|
| <u>List I</u> | <u>List II</u> |
| a. Singrauli Coalfield | 1. Maharashtra |
| b. Raniganj Coalfield | 2. Jharkhand |
| c. Girdih Coalfield | 3. West Bengal |
| d. Kamptee Coalfield | 4. Madhya Pradesh |
- A) a-3, b-4, c-2, d-1 B) a-4, b-3, c-2, d-1
 C) a-2, b-1, c-3, d-4 D) a-4, b-3, c-1, d-2
28. The popular method of digital conversion by on-screen digitizing on top of an ortho-rectified image:
 A) Interactive tracing method B) Automatic digitizing
 C) Head-down digitizing D) Heads-up digitizing
29. The world's longest single tube highway tunnel:
 A) Taihang Tunnel, Taihang, China
 B) Atal Tunnel, Manali, India
 C) Laerdal Tunnel, Aurland, Norway
 D) Seikan Tunnel, Tsugaru Strait, Japan
30. Which of the following statements regarding stereographic projection for structural analysis is incorrect?
 A) In Structural Geology we use the top half of the Spherical Projection
 B) For structural analysis of large set of data and complex deformation patterns the 'π diagram' is preferred
 C) On a stereogram the Beta axis (B-axis) corresponds to the pole of the Great Circle
 D) In a cylindrical fold the poles will lie along a great circle, the π- circle
31. The largest on-shore producer of crude oil and second largest producer of Natural gas in India:
 A) Gujarat B) Rajasthan C) Maharashtra D) Assam

32. Dott's classification scheme of sandstones is based on:
- Grain size and tectonic setting of occurrence.
 - Relative abundance of quartz, feldspars and rock fragments.
 - Textural and structural features.
 - Mineralogy of framework grains and on type of matrix present in between the framework grains.
33. Cross-stratification in tidal dominated areas can lead to the formation of ----- bedding.
- Flaser
 - Epsilon cross
 - Herringbone cross
 - Lenticular
34. The Combined Heat and Power (CHP), which is the simultaneous production, in a sequential process, of electricity (mechanical energy) and useful heat (thermal energy) from a single fossil energy source is known as
- Congregation
 - Cogeneration
 - Consecration
 - Cogitation
35. The first country to give importance to Environmental Impact Assessment (EIA) through its National Environmental Protection Act (NEPA) of 1969:
- Netherlands
 - United States
 - Canada
 - Australia
36. Match the list of ancestors of Horse in List-I with corresponding Geological Periods in List-II
- | <u>List I</u> | <u>List II</u> |
|----------------|----------------|
| a. Miohippus | 1. Pliocene |
| b. Pliohippus | 2. Oligocene |
| c. Epihippus | 3. Miocene |
| d. Merychippus | 4. Eocene |
- a-1, b-2, c-3, d-4
 - a-2, b-1, c-3, d-4
 - a-1, b-2, c-4, d-3
 - a-2, b-1, c-4, d-3
37. The molasse facies of sediments of thick non-marine conglomerates, is deposited in:
- Trench-Slope Basins
 - Aulocogens
 - Oceanic Rift Basins
 - Foreland Basins
38. The correct sequence which shows the decreasing abundance of chemical elements in the Earth's (Continental) crust.
- Si → Fe → O → Ca → Al
 - O → Si → Al → Fe → Ca
 - Fe → Si → O → Al → Ca
 - O → Fe → Si → Ca → Al
39. ----- damp is the term given to the mixture of unbreathable gases found in underground coal mines, formed when oxygen is removed from the mine and is largely replaced by nitrogen, carbon-dioxide, argon and water vapour.
- Fire
 - Stink
 - White
 - Black

40. Match the types of metamorphic facies series with their corresponding geothermal gradients .

List I - Metamorphic facies series

- a. Sanbagawa facies series
- b. Barrovian facies series
- c. Buchan facies series
- d. Franciscan facies series

List II - Geothermal gradients

- 1. $\sim 20^{\circ} - 40^{\circ} \text{ C/km}$
- 2. $< 10^{\circ} \text{ C/km}$
- 3. $10^{\circ} - 20^{\circ} \text{ C/km}$
- 4. $40^{\circ} - 80^{\circ} \text{ C/km}$

- A) a-4, b-3, c-1, d-2
- B) a-3, b-1, c-2, d-4
- C) a-3, b-1, c-4, d-2
- D) a-1, b-3, c-4, d-2

41. What are the climate factors that influence the ratio of oxygen isotopes in ocean water?

- A) Altitude and Latitude
- B) Ocean currents and Sea waves
- C) Evaporation and Condensation
- D) Continentality and Topography

42. Theory of ---- is the theory which proposes that once a species appears in the fossil record, the population will become stable, showing little evolutionary change for most of its geological history.

- A) Phyletic Gradualism
- B) Development and Genetic Homeostasis
- C) Geographic Speciation
- D) Punctuated Equilibria

43. Choose the correct sequence of arrangement of the major Peninsular River Systems based on their lengths from the longest to shortest.

- A) Godavari → Krishna → Narmada → Mahanadi → Kaveri → Tapi
- B) Narmada → Godavari → Kaveri → Krishna → Mahanadi → Tapi
- C) Krishna → Godavari → Kaveri → Narmada → Mahanadi → Tapi
- D) Narmada → Krishna → Godavari → Kaveri → Tapi → Mahanadi

44. Match the important limestone formations of Indian stratigraphy in List-I with the corresponding Groups in List-II.

List I

- a. Vempalli Limestone
- b. Sylhet Limestone
- c. Kajrahat Limestone
- d. Nodular Limestone

List II

- 1. Jaintia Group
- 2. Semri Group
- 3. Papaghni Group
- 4. Bagh Group

- A) a-4, b-3, c-1, d-2
- B) a-1, b-3, c-2, d-4
- C) a-3, b-1, c-2, d-4
- D) a-3, b-1, c-4, d-2

45. The normal range of salinity of sea water is between----- grams per litre.

- A) 200 – 207
- B) 33 – 37
- C) 50 – 55
- D) 25 – 30

46. Which of the following factors do **not** contribute to significant eustatic sea level changes?
- Subsidence or uplift of the earth's crust due to growth or erosion of mountains
 - Changes in total ocean water mass by ice sheet runoff
 - Changes in the size of the ocean by tectonic activities like sea floor spreading
 - Density changes of the sea water by thermal expansion
47. Which of the following is **incorrectly** matched?
- Stull Stoping : Unsupported mining method
 - Longwall Mining : Caving method
 - Cut and Fill : Supported mining method
 - Strip mining : Open cast mining method
48. The characteristic metamorphic texture made of sigmoidal or reverse S-shaped trails of mineral inclusions in poikiloblastic crystals, especially garnets and staurolite, found in regionally metamorphosed rocks:
- Corona texture
 - Hour-glass texture
 - Kelyphitic texture
 - Helicitic texture
49. The Barrovian prograde succession of index minerals produced during regional metamorphism of pelitic rocks:
- Talc → Muscovite → Quartz → Staurolite → Garnet → Kyanite
 - Chlorite → Scapolite → Diopside → Sphene → Sillimanite → Apatite
 - Chlorite → Biotite → Garnet → Staurolite → Kyanite → Sillimanite
 - Scapolite → Chlorite → Garnet → Sphene → Sillimanite → Kyanite
50. Le Chatelier's principle is also called the:
- Equilibrium law
 - Periodic law
 - Law of Thermodynamics
 - Law of Multiple proportions
51. ----- correction is the gravity correction which takes into account the fact that the gravity measurement is usually at a different elevation than the reference ellipsoid at the measurement latitude and longitude.
- Free air
 - Isostatic
 - Bouguer plate
 - Terrain
52. Which of the following statements regarding drilling methods is **incorrect**?
- Percussion Rotary Air Blast drilling is also known as Down the Hole drilling.
 - Calyx drill is also called Shot drill.
 - Reverse circulation drilling is slower and costlier than diamond drilling.
 - Diamond drilling can drill hole in any direction and has the ability to penetrate hard and compact rock formations.
53. The type of breaker waves that occur when long wave period, low amplitude swell waves approach moderately steep shores:
- Plunging breakers
 - Surging breakers
 - Spilling breakers
 - Collapsing breakers

54. The scales which will be characteristic of a large scale map:
 A) 1:50,000 B) 1:10,000 C) 1:250,000 D) 1:100,000
55. ----- correction is the first-order correction made during gravity survey to account for the excess mass underlying observation points higher than the elevation datum.
 A) Terrain B) Bouguer C) Free-air D) Latitude
56. Match the following
 List I - Plant Indicator List II - Minerals
 a. Eriogonium ovalifolium 1. Zinc
 b. Viola calaminara 2. Gold
 c. Vallozia candida 3. Uranium
 d. Equisetum arvense 4. Diamond
- A) a-4, b-2, c-3, d-1 B) a-3, b-1, c-4, d-2
 C) a-1, b-3, c-4, d-2 D) a-3, b-1, c-2, d-4
57. Which of the following statements regarding Vertical Exaggeration in aerial photographs is **incorrect**?
 A) Vertical Exaggeration is directly related to the photographic separation.
 B) Vertical Exaggeration has inverse relation with camera height.
 C) There is a direct relation between Air-base and Vertical Exaggeration
 D) Vertical Exaggeration is said to vary directly with camera focal length.
58. What type of Digital Images are JPEG, TIFF, GIF, PSD AND PNG?
 A) Vector B) Range C) Raster D) Binary
59. ----- belongs to the Geosynchronous Orbit class of satellites.
 A) LANDSAT B) SPOT C) INSAT D) IRS
60. ----- faults are low angle normal faults with regional tectonic significance.
 A) Gravity B) Detachment C) Listric D) Wrench
61. ---- Hypothesis states that the Earth's oceanic crust acts as a recorder of reversals in the geomagnetic field as sea floor spreading occurs.
 A) Hess's B) Wegener's
 C) Taylor's D) Vine-Matthews-Morley
62. ----- soil in India is also known as the 'Omnibus group'.
 A) Red B) Regur C) Alluvial D) Laterite
63. The end of the Pleistocene was marked by the extinction of many genera of large mammals. This mega-faunal extinction event is most distinct in:
 A) South America B) North America
 C) Africa D) Europe

64. Match the type of light/condition used for observing optical properties of minerals under microscope in List-I with the optical property observed in List-II.

List I

- a. Crossed Nicols
- b. Ordinary Light
- c. Convergent Light
- d. Polarized light

List II

- 1. Optic Sign
- 2. Pleochroism
- 3. Extinction Angle
- 4. Refractive Index

- A) a-4, b-3, c-1, d-2
- C) a-2, b-1, c-3, d-4

- B) a-3, b-4, c-1, d-2
- D) a-3, b-4, c-2, d-1

65. The degree of freedom (F) along the cotectic boundary and at the ternary eutectic point for ternary phase diagram at a fixed pressure.

- A) Along cotectic boundary, $F = 0$, at ternary eutectic point, $F = 2$
- B) Along cotectic boundary, $F = 1$, at ternary eutectic point, $F = 2$
- C) Along cotectic boundary, $F = 1$, at ternary eutectic point, $F = 0$
- D) Along cotectic boundary, $F = 2$, at ternary eutectic point, $F = 0$

66. The longest known half-life of any radioisotope that undergoes α -decay.

- A) Bismuth-209
- B) Platinum-244
- C) Uranium-236
- D) Radium-228

67. Goldschmidt's geochemical classification of the elements is based on their:

- A) abundance on the earth's upper continental crust
- B) degrees of stability within the earth's crust
- C) abundance in the meteoroid materials
- D) chemical affinities for various earth materials

68. The term 'Geographic Information System' was first coined by:

- A) Howard Fischer
- B) Roger F. Tomlinson
- C) Jack Dangermond
- D) Charles Picquet

69. Presence of Mesosaurus fossils of Permian age between which of the following two landmasses provides the most noticeable supporting evidence for the Continental Drift Theory?

- A) India and Australia
- B) Africa and South America
- C) North America and Africa
- D) Antarctica and Africa

70. Match the GNSS in List-I with the countries operating them in List-II

List I

- a. GLONASS
- b. BeiDou
- c. NavIC
- d. QZSS

List II

- 1. Japan
- 2. Peoples Republic of China
- 3. Russian Federation
- 4. India

- A) a-3, b-2, c-4, d-1
- C) a-4, b-2, c-3, d-1

- B) a-2, b-3, c-1, d-4
- D) a-3, b-2, c-1, d-4

71. If the height of mountains is considered from the ocean floor, which of the following would be the highest mountain?
A) Mauna Kea B) Mount Kilimanjaro
C) Mauna Loa D) Nanga Parbat
72. Who among the following is known as the ‘Father of Soil Mechanics and Geotechnical Engineering’?
A) Karl von Terzaghi B) Arthur Casagrande
C) Ralph B. Peck D) Charles Augustin Coulomb
73. The total number of crystallographic point groups and crystallographic space groups are ----- respectively.
A) 32 and 230 B) 32 and 320 C) 36 and 360 D) 23 and 26
74. Which of the following pairs of silicate structure and mineral example is correct?
A) Sorosilicates : Feldspar B) Tectosilicates : Olivine
C) Nesosilicates : Hornblende D) Cyclosilicates : Tourmaline
75. Choose the odd one from among the following minerals:
A) Celestite B) Apatite C) Monazite D) Pyromorphite
76. The oldest dated mineral on the earth’s crust:
A) Mica B) Topaz C) Zircon D) Rutile
77. Match the Principal Lunar phases in List-I with the corresponding Intermediate Lunar phases in List-II.

<u>List I</u>	<u>List II</u>
a. Full Moon – Last Quarter	1. Waning Crescent
b. New Moon – First Quarter	2. Waning Gibbous
c. Last Quarter – New Moon	3. Waxing Gibbous
d. First Quarter – Full Moon	4. Waxing Crescent

A) a-3, b-1, c-4, d-2 B) a-4,b-2, c-1, d-3
C) a-2,b-4, c-1, d-3 D) a-2, b-4, c-3, d-1
78. Which of the following statements regarding Compass-clinometer is **incorrect**?
A) It is used to measure the orientation of geological planes and lineations with respect to north
B) It is used in conjunction with a topographic map to accurately determine location
C) When the Compass-clinometer is oriented with the compass window horizontal, the magnetic needle will always point toward magnetic north
D) The Compass-clinometer works on the principle of Trilateration
79. The earth’s deepest operational underground mine:
A) Moab Khotsong Gold Mine, South Africa
B) Kidd Creek Copper and Zinc Mine, Canada
C) Mponeng Gold Mine, South Africa
D) Kolar Gold Fields, India

80. Agglomeration is a metallurgical process in ore beneficiation. The method that does **not** fall under the process of agglomeration is:
 A) Sintering B) Carburizing C) Briquetting D) Pelletizing
81. ----- texture is the type of texture exhibited by Komatites.
 A) Vitrophyric B) Spinifex C) Spherulitic D) Seriate
82. Match the list of long-lived radiogenic isotope systems most commonly used in petrogenetic applications in List-I with corresponding half-lives in List-II
- | <u>List I</u> | <u>List II</u> |
|--|--------------------------------|
| a. $^{147}\text{Sm} - ^{143}\text{Nd}$ | 1. 1.26×10^9 years |
| b. $^{232}\text{Th} - ^{208}\text{Pb}$ | 2. 1.06×10^{11} years |
| c. $^{40}\text{K} - ^{40}\text{Ar}$ | 3. 1.40×10^{10} years |
| d. $^{87}\text{Rb} - ^{87}\text{Sr}$ | 4. 4.88×10^{10} years |
- A) a-4, b-3, c-2, d-1 B) a-2, b-3, c-1, d-4
 C) a-3, b-2, c-1, d-4 D) a-2, b-3, c-4, d-1
83. The law of faunal succession was first recognized in the beginning of the 19th century by:
 A) Nicholas Steno B) William Smith
 C) Georges Cuvier D) L. Dollo
84. Which of the following Morphogenetic regions of L. C. Peltier's Morphogenetic classification is characterized by a climate regime of 'Lower amounts of precipitation but temperature range from low to high annually'?
 A) Boreal B) Selva C) Semi-Arid D) Savanna
85. List I and List II given below are based on the morphological classification scheme for foliations. Match the classes of foliations in List-I with their types in List-II.
- | <u>List I</u> | <u>List II</u> |
|------------------|--------------------|
| a. Disjunctive | 1. Microcontinuous |
| b. Fine | 2. Zonal |
| c. Compositional | 3. Diffuse |
| d. Crenulation | 4. Stylolitic |
- A) a-2, b-3, c-1, d-4 B) a-4, b-1, c-2, d-3
 C) a-1, b-4, c-3, d-2 D) a-4, b-1, c-3, d-2
86. If the hinge line, formed when two folds plunging away from each other are joined, plunges away from a high point, then it will form a:
 A) Dome B) Depression C) Basin D) Culmination
87. The other name for Crushing Strength of a building stone or rock:
 A) Shear Strength B) Tensile Strength
 C) Compressive Strength D) Transverse Strength

88. The imperceptibly slow, steady downward movement of wet soil or rock under the influence of gravity:
 A) Avalanche B) Creep C) Slide D) Earthflow
89. Which of the following is commercial or proprietary GIS software?
 A) QGIS B) GRASS-GIS C) MapInfo Pro D) ILWIS
90. Imaging Spectroscopy is also known as -----sensing.
 A) Microwave Remote B) Thermal Infrared Remote
 C) Hyperspectral Remote D) Visible Remote
91. The Karur-Kambam-Painavu-Trichur (KKPT) Shear Zone lies within ----- Block of the Southern Granulite Terrain.
 A) Salem B) Madurai C) Nilgiri D) Madras
92. The method of drilling that has become increasingly popular for drilling large-diameter boreholes in unconsolidated geologic formations.
 A) Reverse-circulation Rotary Method
 B) Air Rotary Method
 C) Cable-tool Drilling Method
 D) Rotary-Percussion Drilling Method
93. The storage coefficient of an unconfined aquifer will correspond to its
 A) Permeability B) Specific Yield
 C) Specific Retention D) Specific Discharge
94. Match the following regarding Froth Floatation Process in ore beneficiation
 List I - Chemicals/Reagents List II - Examples
 a. Depressants 1. Sodium Cyanide
 b. Activators 2. Amyl Xanthate
 c. Collectors 3. Copper Sulphate
 d. Frothers 4. Pine Oil
 A) a-2, b-3, c-4, d-1 B) a-1, b-3, c-4, d-2
 C) a-3, b-1, c-2, d-4 D) a-1, b-3, c-2, d-4
95. Choose the **incorrect** statement regarding the geochemical dispersion of elements.
 A) Primary dispersion halos are the result of hydrothermal fluids.
 B) The metal values in a dispersion halo are less than those of the deposit.
 C) Secondary dispersion is the result of mechanical and/or chemical weathering.
 D) Primary dispersion halos are usually much more widespread than the secondary dispersion halos.
96. The process of super-continent formation and destruction via repeated cycles of creation and destruction of the oceanic crust is known as the -----Cycle.
 A) Werner B) Milankovitch C) Wilson D) Hutton's

97. ----- drift is the movement of sediment material along a coast by waves that approach at an angle to the shore but recede straight down the beach creating a zig-zag pattern.
 A) Backwash B) Rip current C) Swash D) Longshore
98. Closely spaced contour lines in a topographic map indicate----- land.
 A) Gently sloping B) Steeply sloping
 C) Flat D) Undulating
99. Match the important glaciations / ice ages in the Earth's history in List-I with corresponding Geological Periods in List-II.
- | <u>List I</u> | <u>List II</u> |
|-------------------|-----------------------------|
| a. Karoo | 1. Cryogenian |
| b. Huronian | 2. Siderian-Rhyacian |
| c. Marinoan | 3. Carboniferous-Permian |
| d. Andean-Saharan | 4. Late Ordovician-Silurian |
- A) a-2, b-3, c-1, d-4 B) a-3, b-2, c-4, d-1
 C) a-4, b-2, c-1, d-3 D) a-3, b-2, c-1, d-4
100. Which of the following is **not** an essential condition for the formation of hydrothermal deposits?
 A) Suitable pathways for the migration of ore bearing fluids through the rocks
 B) Long continued crustal stability for the accumulation of deposits
 C) Proper physico-chemical environment for the deposition of ore minerals
 D) Highly active and enriched fluids
101. The Manganese Province of Balaghat-Bhandara-Nagpur falling in the states of Madhya Pradesh and Maharashtra represent -----type of deposits.
 A) Gondite B) Lateritoid C) Kodurite D) Residual
102. Which of the following is the correct sequential arrangement of 'Waste Hierarchy' of Integrated Solid Waste Management from the 'Least favoured' to the 'Most favoured'?
 A) Recycling → Recovery → Reuse → Reduction → Disposal.
 B) Reduction → Reuse → Recovery → Recycling → Disposal
 C) Reuse → Recycling → Recovery → Disposal → Reduction
 D) Disposal → Recovery → Recycling → Reuse → Reduction
103. The process of downward movement of vadose water is called:
 A) Intrusion B) Infiltration C) Diffusion D) Insertion
104. The Champaner Group of rocks belongs to the:
 A) Archaean stratigraphy of Orissa
 B) Proterozoic stratigraphy of Rajasthan
 C) Proterozoic stratigraphy of Chattisgarh
 D) Archaean stratigraphy of Gujarat

105. Match the main types of marine sediments in List-I with their corresponding examples in List-II.

- | <u>List I</u> | <u>List II</u> |
|----------------|--------------------------|
| a. Hydrogenous | 1. Abyssal clays |
| b. Lithogenous | 2. Siliceous oozes |
| c. Cosmogenous | 3. Oolites |
| d. Biogenous | 4. Iron nickel spherules |
- A) a-3, b-1, c-2, d-4 B) a-1, b-3, c-4, d-2
C) a-3, b-1, c-4, d-2 D) a-3, b-2, c-4, d-1

106. Which of the following fossils is the most characteristic one of the Intertrappean Beds?

- A) *Rhynchonella griesbachi* B) *Cardita beaumonti*
C) *Otoceras woodwardi* D) *Physa princepi*

107. The world's largest known impact structure produced due to asteroid impact:

- A) The Vredefort Crater in Free State Province, South Africa
B) The Chicxulub Crater in Yucatan, Mexico
C) The Sudbury Basin in Ontario, Canada
D) The Popigai Crater in Siberia, Russia

108. The Prehnite-Pumpellyite facies is a metamorphic facies transitional between ----- and ----- facies.

- A) Eclogite, Blueschist B) Zeolite, Greenschist
C) Blueschist, Greenschist D) Sanidinite, Eclogite

109. The least dense of all the planets in the Solar System:

- A) Uranus B) Jupiter C) Saturn D) Mercury

110. 'Reversed Magnetic Polarity' provide evidence for:

- A) Origin of Earth B) Continental Drift
C) Expanding Earth D) Sea Floor Spreading

111. The most famous and widely recognized species of "Living Fossil" in the animal kingdom:

- A) The maidenhair tree, *Ginkgo biloba*
B) The Coelocanth, *Latimeria chalumnae*
C) The cedar wood wasp, *Syntaxis libocedrii*
D) The horseshoe crab, *Limulus polyphemus*

112. The oldest acknowledged evidence for life on earth is the fossilized stromatolites from:

- A) Kaapvaal craton, South Africa
B) Dharwar craton, India
C) Pilbara craton, Western Australia
D) Sarmatian craton, Europe

113. The method of well logging which is **not** used to obtain porosity of the subsurface rock formations:
- A) Neutron logging B) Density logging
C) Acoustic logging D) Resistivity logging
114. The Government of India enacted the Environment (Protection) Act on:
- A) 23rd May, 1986 B) 4th May, 1994
C) 27th January, 1994 D) 6th January, 1989
115. Find the odd one out from among the following sedimentary structures:
- A) Nodules B) Desiccation C) Concretion D) Stylolite
116. ----- Mapping is the method of field mapping which is more detailed and is used to produce maps in scale between 1:15,000 and 1:1000.
- A) Contact B) Linear Traverse
C) Exposure D) Closed compass Traverse
117. Match the minerals with their corresponding compositions:
- | | |
|-------------------------|------------------------------|
| List I- <u>Minerals</u> | List II - <u>Composition</u> |
| a. Leucite | 1. $Fe_3Al_2Si_3O_{12}$ |
| b. Forsterite | 2. $LiAlSi_2O_6$ |
| c. Almandine | 3. $KAlSi_2O_6$ |
| d. Spodumene | 4. Mg_2SiO_4 |
- A) a-4, b-3, c-1, d-2 B) a-3, b-4, c-2, d-1
C) a-4, b-1, c-3, d-2 D) a-3, b-4, c-1, d-2
118. ----- Sampling is the most accepted method of sampling in geochemical exploration, which is best suited to bedded, banded and vein type of deposits.
- A) Groove B) Car C) Grab D) Chip
119. Which of the following statements regarding the asthenosphere of the earth is **incorrect**?
- A) The Earth's tectonic plates move on top of the asthenosphere
B) The asthenosphere is a relatively strong and rigid layer of the mantle
C) The asthenosphere is the primary source of most magma
D) The asthenosphere is called the 'low-velocity zone'
120. The depositional feature made of alluvium formed at the slip-off slope of a meandering river.
- A) Polje B) Kame C) Point-bar D) Hornito