A

23711 **120 MINUTES**

1. Which of the following regarding the Cenozoic succession of Assam is **not** correctly matched?
   A) Renji Formation : Barail Group
   B) Laisong Formation : Surma Group
   C) Sylhet Limestone : Jaintia Group
   D) Girujan Clays : Tipam Group

2. Identify the correct statement regarding extinction of minerals among the following:
   A) All sections of minerals crystallizing in Triclinic System give symmetrical extinction
   B) Clinopinacoidal sections of minerals crystallizing in Monoclinic System give straight extinction
   C) Pinacoidal sections of minerals crystallizing in Orthorhombic System give straight extinction
   D) Sections of minerals crystallizing in the Tetragonal and Hexagonal Systems give oblique extinction

3. A cuspate, bulged or lobate form of coarse lineation developed in strongly deformed rocks, within the rock or at lithological interfaces of competent and incompetent units:
   A) Slickenline B) Boudin
   C) Pinch and Swell D) Mullion

4. Match the items in List-I with those in List-II:

List-I	List-II
a. Concept of Quantification, Concept of Time and Concept of Equilibrium	1. Schumm's theory
b. Concept of Geomorphic Thresholds and Concept of Complex Response	2. Davisian theory
c. Concept of Geographical Cycle	3. Penck's theory
d. Concept of Slope Development and Weathering Processes	4. Gilbert's theory

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

5. The most common topological data structure in GIS is ---- data model.
   A) Arc-Node B) Polygon-Arc
   C) Spaghetti D) Polygon

6. Match the Indian Remote Sensing Satellites in List-I with their other name in List -II:

List -I	List -II
a. IRS-P6	1. Edusat
b. IRS-P4	2. Cartosat
c. IRS-P5	3. Oceansat
d. GSAT-3	4. Resourcesat

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

7. Which of the following statements regarding biogeochemical exploration is **incorrect**?
   A) Biogeochemical anomalies are areas where vegetation contains an abnormally high concentration of metals
   B) Universal indicator plants are found only on mineralized soils and do not grow elsewhere
   C) In biogeochemical surveys shallow rooted plants are generally preferred to deep rooted plants
   D) The concentrations of trace elements decrease in the order of leaves, twigs, root and bark

8. Match the Isotopes in List -I with their Geological Applications in List -II:

List -I	List -II
a. Sulphur	1. As temperature or climate proxies
b. Oxygen	2. As a tool for stratigraphic correlation and resolving the evolution of Precambrian Earth
c. Hydrogen	3. As oceanic transient tracer and tracing of groundwater
d. Nitrogen	4. As proxies for depositional redox conditions

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

9. To make a boundary between two different rock units in the field the most important thing we need to do is:
   A) Apply the 'V' Rule.
   B) Make a cross section of the geologic units in the field.
   C) Measure strike and dip in field observation.
   D) Take a documentation using digital camera.

10. The Bering Land Bridge that did **not** emerge until around 35700 years ago, less than 10000 years before the height of the Last Glacial Maximum, connects:
   A) Asia to Africa B) North America to South America
   C) Europe to Asia D) Asia to North America

11. There are five discontinuities inside the Earth. The correct sequential arrangement of these dis continuities from the Core to the Crust of the Earth is:
A) Guttenberg Discontinuity → Lehman Discontinuity → Mohorovicic Discontinuity → Repeti Discontinuity → Conrad Discontinuity
B) Lehman Discontinuity → Repeti Discontinuity → Guttenberg Discontinuity → Conrad Discontinuity → Mohorovicic Discontinuity
C) Guttenberg Discontinuity → Lehman Discontinuity → Repeti Discontinuity → Conrad Discontinuity → Mohorovicic Discontinuity
D) Lehman Discontinuity → Guttenberg Discontinuity → Repeti Discontinuity → Mohorovicic Discontinuity → Conrad Discontinuity

12. Which of the following geomagnetic reversals is a marker for the Global Boundary Stratotype Section and Point (GSSP) defining the base of the Chibanian Stage and Middle Pleistocene Subseries at the Chiba Section, Japan?
A) Gauss-Gilbert B) Brunhes-Matuyama
C) Gauss-Matuyama D) Matuyama-Gilbert

13. The underground coal mining method which is the preferred method of mining for extraction of coal from thick seams:
A) Horizon mining
B) Board and Pillar mining
C) Short-wall mining with single slicing
D) Long-wall mining with multi slicing

14. A recent methodology for stratigraphic interpretation pioneered by Peter Vail in the mid 70's:
A) Sequence Stratigraphy B) Pedostratigraphy
C) Cyclostratigraphy D) Chemostratigraphy

15. The 'Safe Yield' of an aquifer is:
A) The total volume of water obtained from the aquifer less the water lost from it due to evapo-transpiration
B) The average volume of water that can be drained from the aquifer, per unit surface area of aquifer, per unit drop of hydraulic head
C) The amount of water that can be withdrawn from it annually without producing an undesired result
D) The total quantity of water that can be withdrawn from it annually

16. The most abundant and the most diverse of the Martian meteorite subgroups:
A) Nakhlites B) Lherzolites C) Chassignites D) Shergottites

17. The deepest underground coal mine in India is:
A) Singareni, Telengana B) Chinakuri, West Bengal
C) Singrauli, Madhya Pradesh D) Jharia, Jharkhand

18. Match the Types of Coasts in List -I with their Examples in List -II:

List -I	List -II
a. Haff Coastline	1. Narragansett Bay, Rhode Island, U.S.A.
b. Ria Coastline	2. Baltic Coast of Germany
c. Dalmatian Coastline	3. Eastern shore of Adriatic Sea, Croatia
d. Fjord Coastline	4. Sognefjorden, Norway

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

19. The metamorphic texture, which is inherited from the protolith rock textures that is preserved even after the metamorphism is ----- texture.
A) Corona B) Kelyphitic C) Mylonitic D) Palimpsest

20. One of the most typical types of wall-rock alteration in aluminium-rocks, such as slates, granites, etc. found in ore fields all over the world.
A) Sericitization B) Propylitization
C) Chloritization D) Potassic alteration

21. The Alwarez Hypothesis is related to the:
A) Younger Drias cold period, the Big Freeze.
B) Cretaceous-Tertiary (K-T) mass extinction event.
C) Origin of life on earth and evolution of biological complexity.
D) Isostasy of Earth's crust.

22. Who first developed the idea that chemical reactions on the early Earth could have led to the production of a range of organic compounds, forming a 'primordial soup' in which the required building blocks for life would have been present?
A) Mendel and Lamarck B) Charles Darwin
C) Miller and Urey D) Oparin and Haldane

23. -----energy is a non-renewable source of energy.
A) Geothermal B) Nuclear C) Wind D) Tidal

24. The mineral assemblage wollastonite + anorthite + diopside in metamorphosed carbonate rocks is characteristic of which facies of metamorphism?
A) Eclogite facies B) Sanidinite facies
C) Blueschist facies D) Zeolite facies

25. The geologist who first proposed the concept of layering in sedimentary rocks and introduced the term 'strata' to denote the layers:
A) William Smith B) Nicholas Steno
C) James Hutton D) Charles Lyell

26. Which of the following statements is **incorrect**?
A) Three-fourths of the Earth's surface is occupied by water.
B) 97.5% of the total volume of water on Earth is fresh water and 2.5% is salt water.
C) The cryosphere is the frozen water part of the Earth water system.
D) The total mass of both underground and surface water on the surface of the Earth constitutes the hydrosphere.

27. Match the components in List -I with their corresponding relative abundance of elements in List -II.

List -I	List -II
a. Moon's surface	1. O>Si>Al>Fe>Ca
b. Sea water	2. O>Cl>H>Na>Mg
c. Earth's crust	3. H>He>O>C>Ne
d. Universe	4. O>Si>Fe>Mg>Ca

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

28. A series of overlapping rock slices separated by steeply inclined sub-parallel reverse faults and bounded above and below by major low-angle thrust surfaces:
A) Flucan structure B) Fenester and Klippe structures
C) Overthrust D) Schuppen structures

29. The Mid-oceanic ridges located in the Pacific Ocean:
A) Kermadec Ridge B) Carlsberg Ridge
C) Reykjanes Ridge D) Murray Ridge

30. In a binary system, when two mineral components crystallize or melt simultaneously at a particular or fixed temperature, the process is called ---- crystallization.
A) Reactive B) Eutectic C) Fractional D) Evaporative

31. Which of the following hypothesis of origin of Earth does **not** belong to the category of the 'cold' origin of Earth?
A) Meteorite Hypothesis of O. J. Schmidt
B) Tidal Hypothesis of Jeans and Jeffreys
C) Proto-planetary Hypothesis of Kuiper
D) Weizacker's Hypothesis

32. A mining method which does **not** belong to the category of Alluvial Mining Methods:
A) Sluicing B) Gophering
C) Hydraulicking D) Dredging

33. The diagenetic processes in the formation of sedimentary rocks cannot bring which of the following changes in the rocks?
A) Complete or partial dissolution of minerals
B) Replacement of one mineral by another mineral
C) Baking and change of mineral structure of rock
D) Mobilization and migration of elements

34. The most accepted method of sampling of ore mineral deposits which is best suited for bedded, banded, vein, stringer and disseminated type of deposits.
A) Bulk sampling B) Channel sampling
C) Muck sampling D) Chute sampling

35. Identify the correct statements regarding glacial-interglacial periods/cycle.
1. An interglacial is the warmer break in between two ice ages (glacials) where glaciers retreat.
2. Atmospheric and Terrestrial triggered ice ages or glacial are the most common categories.
3. During a glacial, sea levels rise and during an interglacial, sea levels drop.

A) 1, 2 & 3 B) 1 & 2 only C) 1 only D) 2 only

36. The first commercial GIS software:
A) MapInfo B) ArcGIS C) AGISMap D) ARC/INFO

37. Which of the following factors does **not** affect 'Vertical Exaggeration' in aerial photographs?
A) Focal length of camera B) Eye-base
C) Weather conditions D) Flying altitude

38. Match the Permo-carboniferous Tillites as supporting evidences of Continental Drift Theory in List-I, with their regions of present day occurrence in List -II

List -I	List -II
a. Dwyka Tillites	1. Antarctica
b. Talchir Tillites	2. South Africa
c. Tubaro Tillites	3. India
d. Pagoda Tillites	4. Brazil

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

39. The mineral discovered in the lunar rocks collected by Apollo 11 astronauts:
A) Perovskite B) Painite C) Kyawthuite D) Armalcolite

40. Match the Indices/Scales in List -I with their corresponding Natural Hazards in List -II:

List -I	List -II
a. Palmer Index	1. Hurricane
b. Richter Scale	2. Drought
c. Soloviev-Imamura Scale	3. Earthquake
d. Saffir-Simpson Scale	4. Tsunami

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

41. Who discovered the asteroid Ceres in the asteroid belt on 1st January 1801?
A) Karl Ludwig Hencke B) Herman Goldschmidt
C) Giuseppe Piazzi D) Carl Friedrich Gauss

42. A zone around a mineral deposit where the metal values are less than those of the deposit but significantly higher than the background values found in the country rocks around the deposit.
A) Halazone B) Dispersion Halo
C) Epithermal Zone D) Stringer Lode Zone

43. Which of the following is **not** used in 'Fission-track dating'?
A) Zircon B) Tourmaline C) Sphene D) Apatite

44. -----classification is the classification scheme of igneous rocks on the basis of their actual mineral contents measured in volume percent, i.e., on the basis of their quantitative modal composition:
A) IUGS B) Tabular C) CIPW D) TAS

45. The Cyprus type volcanogenic massive sulphide deposits are usually associated with-----.
A) Kimberlites B) Carbonatites C) Ophiolites D) Peridotites

46. Match the Type of Ore deposits in List -I with the World occurrences in List -II:

List -I	List -II
a. Tin and tungsten deposits of Cornwall	1. Sedex deposits
b. Bingham Canyon Mine Copper Deposit of Utah, U.S.A	2. Greisen deposits
c. Witwatersrand Gold deposits, South Africa	3. Palaeo-placer deposits
d. Zambian Copper Belt	4. Porphyry deposits

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

47. The texture characteristic of komatitic rock in which randomly oriented, extremely fine-grained, slender, hollow crystals or acicular olivine phenocrysts are formed by rapid cooling or quenching of ultramafic lavas:
A) Eutaxitic B) Spherulitic C) Kelyphitic D) Spinifex

48. Which of the following is **not** an advantage of Raster data in GIS?
A) Represents continuous features
B) Accurately represents true shape and size
C) Easy workflow and analysis
D) Easy to produce

49. The correct sequence of index minerals with increasing metamorphic grade in metamorphic terrains:
A) Biotite → Chlorite → Andalusite → Almandine Garnet → Sillimanite → Kyanite
B) Chlorite → Muscovite → Almandine Garnet → Andalusite → Kyanite → Sillimanite
C) Muscovite → Chlorite → Andalusite → Calcite → Sillimanite → Kyanite
D) Chlorite → Biotite→Almandine Garnet → Staurolite → Kyanite → Sillimanite

50. The Ryoke-Abukama belt of the Sanbagawa-Ryoke paired metamorphic belt in Japan represents :
A) High pressure / Low temperature belt
B) Low pressure / High temperature belt
C) High pressure / High temperature belt
D) Low pressure / Low temperature belt

51. What are the brown lines of differing widths that represent points of equal elevation in a topographic map?
A) Isohyets B) Contours C) Isobaths D) Secants

52. Which of the following statements regarding geological field equipment and their uses is **incorrect**?
A) Topographic map is used to make traverse for the field track
B) GPS is used to determine location in the field
C) Geological loupe is used to measure stratigraphic thicknesses in the field
D) Geological compass is used to measure the attitude of rocks in the field

53. The synonym for 'Death Assemblage' in Stratigraphy:
A) Phytocoenosis B) Biocoenosis
C) Thanatocoenosis D) Taphocoenosis

54. The correct order of waste management hierarchy is:
A) Prevention→ Disposal → Recycle → Reuse
B) Prevention → Recycle → Reuse → Disposal
C) Prevention → Reuse → Recycle → Disposal
D) Recycle → Reuse → Disposal → Prevention

55. The geological condition most ideal for dam construction is tilted beds with---.
A) Gentle downstream dip B) Gentle upstream dip
C) Steep downstream dip D) Steep upstream dip

56. Match the Types of Microfossils in List -I with the examples in List -II:

List -I	List -II
a. Phosphatic microfossils	1. Conodonts
b. Calcareous microfossils	2. Radiolarians
c. Siliceous microfossils	3. Chitinozoans
d. Organic microfossils	4. Coccoliths

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

57. The intrusive granitic pluton body formed at the final stages of Bhilwara Supergroup of Aravalli-Bundelkhand province:
A) Erinpura Granite B) Closepet Granite
C) Siwana Granite D) Berach Granite

58. The Geological Survey of India established in ----- at -----.
A) 1851; Kolkata B) 1841; Delhi
C) 1861; Jaipur D) 1841; Hyderabad

59. Match the List -I (Axial Lengths and Angles) with List -II (Crystal Systems):

List -I	List -II
a. $a \neq b \neq c$; $\alpha = \beta = \gamma = 90^o$	1. Trigonal
b. $a = b = c$; $\alpha = \beta = \gamma = 90^o$	2. Orthorhombic
c. $a = b \neq c$; $\alpha = \gamma = 90^o$, $\beta \neq 90^o$	3. Monoclinic
d. $a = b = c$; $\alpha = \beta = \gamma \neq 90^o$	4. Cubic

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

60. A six-faced crystal form wherein three faces on top are offset by three identical upside down faces on the bottom, as a result of 3-fold roto-inversion axis:
A) Octahedron B) Rhombohedron
C) Dipyramid D) Scalenohedron

61. Which one of the following statements regarding gravity anomalies is **incorrect**?

A) Over Mid-oceanic ridges, the free-air anomalies are small.
B) The Bouguer anomaly is positive over high continental areas and negative over ocean basins.
C) Intense isostatic and free-air anomalies occur along island-arcs.
D) The Bouguer anomaly minus the gravity anomaly due to the sub-surface compensation is the Isostatic anomaly.

62. Plasticity Index for Sandy soil is:

A) 0 B) < 7 C) < 17 D) > 17

63. Match the Igneous rock types in List -I with their corresponding minerals in List-II

List -I	List -II
a. Peridotite	1. K-feldspar (Sanidine), Na-rich, plagioclase, Quartz, Biotite
b. Syenite	2. Ca-rich plagioclase, Clinopyroxene, and/or Orthopyroxene, Olivine, Amphibole
c. Rhyolite	3. Olivine, Orthopyroxene, Clinopyroxene
d. Gabbro	4. Alkali feldspar, Plagioclase, Amphibole, Biotite, Pyroxene

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

64. The portal of Indian Space Research Organization (ISRO) which provides all Digital Elevation Model (DEM) data of India:

A) Yuktdhara B) I-grasp C) Bhuvan D) MOSDAC

65. The best known example of piedmont glacier:

A) Vatnajokull Glacier of Iceland
B) Lambert Fisher Glacier of Antarctica
C) Malaspina Glacier of Alaska
D) Fedchenko Glacier of Tajikistan

66. ACF, AKF and AFM are the common triangular plots used in Metamorphic Petrology. Which of the following statements regarding these triangular plots is **incorrect**?

A) AKF diagrams are used for CaO-rich, K_2O poor rocks
B) AFM diagrams are good for Fe-Mg solid solution phases
C) ACF diagrams are used for Al_2O_3 and CaO-rich rocks
D) Combined ACF/AKF diagrams are a good way to view mineral assemblages in most meta-sedimentary rocks

67. Choose the correct increasing order of concentrations of ionic constituents of sea water from among the following:

A) $K^+ \rightarrow Mg^{2+} \rightarrow Ca^{2+} \rightarrow SO_4^{2-} \rightarrow Cl^- \rightarrow Na^+$

B) $K^+ \rightarrow Ca^{2+} \rightarrow Mg^{2+} \rightarrow SO_4^{2-} \rightarrow Na^+ \rightarrow Cl^-$

C) $Mg^{2+} \rightarrow Ca^{2+} \rightarrow K^+ \rightarrow Na^+ \rightarrow SO_4^{2-} \rightarrow Cl^-$

D) $Ca^{2+} \rightarrow K^+ \rightarrow Mg^{2+} \rightarrow SO_4^{2-} \rightarrow Cl^- \rightarrow Na^+$

68. The vertical stratigraphic succession that typifies marine transgression and regression is a classic example of:

A) Stefan's Law B) Walther's Law

C) Steno's Law D) Uddens's Law

69. Which of the following is the correct hierarchical sequence of Periods of the Phanerozoic Eon in the Geological Time Scale?

A) Silurian $\rightarrow$ Cambrian $\rightarrow$ Triassic $\rightarrow$ Permian $\rightarrow$ Palaeogene

B) Cambrian $\rightarrow$ Silurian $\rightarrow$ Permian $\rightarrow$ Triassic $\rightarrow$ Palaeogene

C) Cambrian $\rightarrow$ Permian $\rightarrow$ Silurian $\rightarrow$ Palaeogene $\rightarrow$ Triassic

D) Permian $\rightarrow$ Cambrian $\rightarrow$ Silurian $\rightarrow$ Palaeogene $\rightarrow$ Triassic

70. The single largest mass extinction known on the Earth, also called the "Great Dying", which depleted a wide range of species including vertebrates.

A) Permian - Triassic Extinction

B) Cretaceous - Tertiary Extinction

C) Ordovician - Silurian Extinction

D) Triassic - Jurassic Extinction

71. Match the Formations of Gondwana Supergroup in List -I with their ages in List -II:

List -I	List -II
a. Talchir Formation	1. Lower Triassic
b. Kota Formation	2. Upper Permian
c. Raniganj Formation	3. Middle Jurassic
d. Panchet Formation	4. Lower Cretaceous

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

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

72. Which of the following are **not** Quaternary 'proxies'?

A) Stromatolites B) Ostracodes

C) Foraminifera D) Diatoms

73. The units of feet per day, gallons per day per square foot, metres per day and metres per second are characteristic of:

A) Intrinsic Permeability B) Storativity

C) Transmissivity D) Hydraulic Conductivity

74. Ramsay's Fold classification is based upon curvature of the inner and outer lines of a fold, and the behaviour of dip isogons. Which of the following are correct according to this scheme of classification?

1. Class 2 – Dip isogons are parallel
2. Class 1A – Limbs thicker than hinges
3. Class 3 – Dip isogons converge downward towards axial surface
4. Class 1B – Layer thickness constant

A) 1 & 2 only B) 2 & 3 only C) 1, 2 & 4 only D) 3 & 4 only

75. Which one among the following is considered to be the oldest fold mountain in the world?

A) Rockies of North America
B) Tian Shan Mountains of Central Asia
C) Andes of South America
D) Aravalli Mountains of India

76. Match the Arenite types in List -I with their corresponding Constituents in List -II, based on Dott's scheme of classification of Sandstones:

List -I	List -II
a. Lithic Arenite	1. More than 25% rock fragments and more rock fragments than feldspar
b. Arkosic Arenite	2. More than 5% feldspar and more feldspar than rock fragments
c. Quartz Wackes	3. More than 25% feldspar and more feldspar than rock fragments
d. Arkosic Wackes	4. More than 95% quartz grains

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

77. The statements given below refer to the underground mining methods. Which of the statement/s is/are correct?

1. Top slicing is a good method for soft ores with weak walls.
2. Shrinkage stoping is used in gently dipping lodes with weak walls.
3. The operation of the sublevel stoping involves a considerable amount of development work.

A) 1 & 2 only B) 3 only C) 2 only D) 1, 2 & 3

78. ---- classifiers used in ore beneficiation uses centrifugal forces to classify particle in a fluid that experiences essentially free vortex motion inside the device.

A) Spiral B) Hydrocyclone
C) Rake D) Hydraulic

79. The remote sensing sensor that does **not** belong to the category of Space-borne Hyperspectral Sensors:
A) CHRIS B) Hyperion C) MODIS D) AVIRIS

80. Which one of the following statements regarding Relief Displacement 'd' in aerial photographs is correct?
A) 'd' is directly proportional to the flying height 'H'.
B) 'd' is directly proportional to the height 'h' of the object.
C) 'd' is directly proportional to the focal length 'f' of the aerial camera
D) 'd' is inversely proportional to the radial distance 'r between the displaced image and the principal point.

81. The Queen Charlotte Fault marking the boundary of the North America and Pacific Plates along the north-western margin of British Columbia is a---- Plate Boundary.
A) Constructive B) Transform
C) Convergent D) Divergent

82. Match the Orogenies in List -I with their global places of occurrence in List-II:

List -I	List -II
a. Carpathian Orogeny	1. North America
b. Pasadena Orogeny	2. Europe
c. Napier Orogeny	3. Australia
d. Kararan Orogeny	4. Antarctica

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

83. The engineer and scientist who invented the 'Brazilian Test' to determine the tensile strength of rocks:
A) Charles Augustin Coulomb
B) Karl von Terzaghi
C) Fernando L.L.B. Carneiro
D) Arthur Casagrande

84. The in-situ field testing method of soils and rocks grouped under the category of Correlation Tests:
A) Cone Penetration Test B) Pump Test
C) Standard Penetration Test D) Packer Test

85. Which among the following is **not** a symptom of desertification?
A) Development of Hydric soils
B) Desiccation of Soil profile
C) Soil erosion
D) Salinisation

86. Which of the following electrode arrays used in Electrical Resistivity Survey for groundwater has the widest horizontal coverage and the deepest depth of investigation but the poorest resolution?

A) Pole-Dipole B) Wenner and Schlumberger
C) Dipole-Dipole D) Pole-Pole

87. The building stone which is greatly objectionable for use in building construction in moist conditions:

A) Gneiss B) Limestone C) Marble D) Granite

88. According to the Le Chatelier's principle, in endothermic reactions, a decrease in temperature -----.

A) first decreases and then increases the product formation
B) increases the product formation
C) decreases the product formation
D) does not affect the reaction

89. Match the Codes of International UNFC Classification System of Reserves and Resources in List -I with their corresponding terms in List -II

List -I	List -II
a. 211	1. Probable Mineral Reserve
b. 111	2. Proved Mineral Reserve
c. 331	3. Feasibility Mineral Reserve
d. 121	4. Measured Mineral Resource

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

90. The country that holds the maximum deep-sea mining contracts issued by the International Seabed Authority:

A) China B) Canada C) Japan D) United States

91. The most important secondary pollutant of air among the following:

A) Carbon Monoxide B) Ground level Ozone
C) Sulphur Dioxide D) Particulate matter

92. The analytical method used for non-destructive in-situ chemical analysis of elements in minerals ranging from Beryllium to Uranium with detection limits 0.1 to 0.01% using in-built Wavelength Dispersive Spectrometer (WDS) and Energy Dispersive Spectrometer (EDS):

A) Electron Probe Micro Analyser (EPMA)
B) Scanning Electron Microscope (SEM)
C) X-ray Fluorescence (XRF)
D) X-ray Diffraction (XRD)

93. Nimar Sandstone, Nodular Limestone and Coralline Limestone constitute which following lithostratigraphic unit in Indian stratigraphy?

A) Umia Beds
B) Sulcaculus Beds
C) Bagh Beds
D) Hedenstroemia Beds

94. Match the habits of minerals in List -I with the mineral examples in List -II.

List -I	List -II
a. Tabular	1. Tridymite
b. Fibrous	2. Wollastonite
c. Reticulated	3. Cerrusite
d. Scaly	4. Satin-spar

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

95. The Vindhyan Supergroup of rocks is characterized by number of Shale Formations from Lower Vindhyans to Upper Vindhyans. The correct younging sequence of the Vindhyan Shales from oldest to youngest is:

A) Suket Shales → Bijaigarh Shales → Binota Shales → Panna Shales → Sirbu Shales → Jhiri Shales
B) Binota Shales → Suket Shales → Bijaigarh Shales → Panna Shales → Jhiri Shales → Sirbu Shales
C) Bijaigarh Shales → Suket Shales → Sirbu Shales → Binota Shales → Panna Shales → Jhiri Shales
D) Suket Shales → Binota Shales → Bijaigarh Shales → Sirbu Shales → Jhiri Shales → Panna Shales

96. The other name for Regur Soil:

A) Laterite Soil
B) Black Soil
C) Red Soil
D) Alluvial Soil

97. The morphometric analysis of drainage basins includes the analysis of the characteristics of linear, areal and relief aspects of fluvially originated drainage basins. Choose the correct statement regarding this aspect from among the following options:

A) The stream frequency is directly proportional to stream order
B) The stream number is inversely proportional to size of contributing basin and to the channel dimension
C) The higher bifurcation ratio leads to more chances of risk of flooding
D) The stream frequency exhibits a positive correlation with drainage density in the watershed

98. Leakage anomalies are generally associated with----- deposits.

A) Hydrothermal
B) Magmatic
C) Contact metasomatic
D) Pegmatitic

99. Match the mineral deposits in List -I with their corresponding mineral indicators in List -II

List -I	List -II
a. Base metals	1. Cr-pyrope garnet
b. Diamond	2. Lepidolite/Spodumene
c. Lithium deposits	3. Fayalite
d. REE deposits	4. Sphalerite

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

100. The type of rock cleavage that contains microlithons that were warped by a previous foliation:

A) Crenulation cleavage B) Slaty cleavage
C) Disjunctive cleavage D) Transposition cleavage

101. Eustatic sea level changes are driven by different processes that cause changes in the volume or mass of the world ocean and result in globally uniform mean sea level variations. Which of the following processes is **not** responsible for eustatic sea level changes?

A) Tectonic sea floor spreading or sedimentation.
B) Thermal expansion of the water.
C) Subsidence or uplift of the crustal land.
D) Melting or accumulation of continental ice sheets over time.

102. Match the type of folds in List-I with their corresponding characteristics in List -II:

List -I	List -II
a. Parallel folds	1. Inclined hinge line
b. Similar folds	2. Parallel limbs
c. Plunging folds	3. Thinner limbs and thicker hinges
d. Isoclinal folds	4. Orthogonal thickness of layers constant throughout

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

103. Which of the following is **not** correctly matched?

A) Iron-nickel Spherules : Cosmogenous
B) Siliceous Ooze : Biogenous
C) Evaporites : Lithogenous
D) Manganese Nodules : Hydrogenous

104. The concept of 'Punctuated Equilibria' was first proposed by:

A) Dawkins and Dennet B) Gould and Elridge
C) Mayr and Lerner D) Benton and Simpson

105. The type ammonoid for the Palaeozoic Era:
A) Ceratites B) Goniatites C) Ammonites D) Agoniatites

106. Radiating cracks at the centre of the rock or carbonate materials in large and oblate nodules are termed:
A) Septaria B) Kankar C) Stylolites D) Stromatolites

107. The Ghyben-Herzberg relation in coastal aquifers tells that:
A) the depth of freshwater-saline water interface below MSL is 40 times the elevation of phreatic level above MSL
B) the depth of freshwater-saline water interface below MSL is equal to the elevation of phreatic level above MSL
C) the elevation of phreatic level above MSL is 40 times the depth of freshwater-saline water interface below MSL
D) the depth of freshwater-saline water interface below MSL is equal to the reciprocal of 40 times the elevation of phreatic level above MSL

108. The second stage in Digital Image Processing entails five different operations. The correct sequential order of the operations from the first to the last is:
A) Image Registration → Image Enhancement → Image Filtering→ Image Transformation → Image Classification
B) Image Classification → Image Registration → Image Filtering → Image Enhancement → Image Transformation
C) Image Registration → Image Classification → Image Filtering → Image Transformation → Image Enhancement
D) Image Registration → Image Classification → Image Filtering →Image Enhancement →Image Transformation

109. The Representative Fraction (RF) on maps is a ---- Scale.
A) Linear B) Graphical C) Verbal D) Ratio

110. The best records of climate change during the Quaternary:
A) Carbon isotope records from fossil fuel accumulations.
B) Hydrogen isotope records from upper atmosphere and deep sea water.
C) Oxygen isotope records from deep sea cores and glacial ice cores.
D) Uranium, thorium and lead isotope records from fluvio-glacial lacustrine sediments.

111. The first Miocene hominoid reported from Southern Africa:
A) Otavipethecus B) Morotopithecus
C) Proconsul D) Afropithecus

112. ----- expedition is the world's first successful manned expedition to the deepest points in each of the world oceans.
A) The Challenger B) The Nautilus
C) The Five Deeps D) The Bathyscape Trieste

113. The epicentre of the 7.8 Magnitude Turkey-Syria earthquake that occurred on 6th February 2023:
A) 37 km west-northwest of Gaziantep
B) 90 km west of Murghob, Tajikistan
C) 16 km west-southwest of Mamurras
D) 30 km south of Halabja

114. The theory which tells that the Earth's magnetic field is generated due to the electric current produced by convective motion of metallic fluids in the outer core of the Earth:
A) Hubble's Theory B) Effective Field Theory
C) Dynamo Theory D) Quantum Field Theory

115. A lithostratigraphic unit composed of diverse types of any class or classes of rocks and characterized by irregularly mixed lithology or by highly complicated structural relations:
A) Formation B) Supergroup C) Group D) Complex

116. The Older Greenstone Belt in Dharwar Craton:
A) Mangalwar Complex B) Sargur Schist Complex
C) Dharwar Supergroup D) Peninsular Gneissic Complex

117. The divergent boundary of the Indian Plate with the African plate is called:
A) Murray Ridge B) Central Indian Ridge
C) Owen Fracture Zone D) Chaman Fault Zone

118. The largest inland oil discovery in India:
A) Mangala Oil Field in Rajasthan
B) Digboi Oil Field in Assam
C) Narimanam Oil Field in Cauvery delta
D) Ankleshwar Oil Field in Gujarat

119. Which of the following is the most favourable evidence that indicates stream rejuvenation?
A) Natural Levees B) Entrenched Meanders
C) Flood Plains D) Cuestas and Hogbacks

120. The quality of a sensor that can record the number and dimension of wavelength bands of electromagnetic spectrum, employed in image acquisition:
A) Spectral Resolution B) Radiometric Resolution
C) Spatial Resolution D) Temporal Resolution

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