1. Ichnology is that branch of paleontology which deals with the study of

(A) fossil shells

(B) fossil leaves

(C) trace fossils

(D) microscopic fossils

2. Which of the following minerals has the highest scratch resistance on the Mohs scale?

(A) Talc

(B) Quartz

(C) Calcite

(D) Corundum

3. According to Goldschmidt's geochemical classification, the high-density transition metals which tend to sink into the core because they dissolve readily in iron either as solid solutions or in the molten state, is known as

(A) lithophile elements

(B) siderophile elements

(C) chalcophile elements

(D) atmophile elements

4. The earliest known vertebrates appeared in which geologic period?

(A) Cambrian

(B) Ordovician

(C) Silurian

(D) Devonian

5. The difference between weathering and erosion in rocks is

(A) both occur *in-situ*

(B) weathering happens *in-situ*, while erosion involves transportation of the disintegrated materials

(C) both involve transportation

(D) erosion occurs *in-situ* and weathering involves transportation of the disintegrated materials

6. An unstratified, unsorted depositional landform representing accumulation of rock debris carried or deposited by a glacier and in which the constituent particle size ranges from boulders to sand and clay, is known as

(A) cirque

(B) arete

(C) moraine

(D) esker

7. The most destructive earthquake waves are

(A) P-waves

(B) S-waves

(C) both P- and S-waves

(D) Love and Rayleigh waves

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8. Which of the following isotopes is ***not*** considered as a stable isotope, since it undergoes radiometric decay?

(A) ^{18}O

(B) ^{34}S

(C) ^{13}C

(D) ^{14}C

9. In the mega-fossil brachiopods, the two valves are

(A) symmetrical along hinge line

(B) asymmetrical along hinge line but symmetrical about the midline

(C) identical like in bivalves

(D) absent

10. The earth's magnetic field is mainly due to

(A) crustal rocks

(B) rotation of earth

(C) movement of earth's liquid outer core

(D) mantle convection

11. Gravity anomaly interpretation requires geological knowledge because

(A) gravity data directly gives rock ages

(B) gravity cannot detect faults

(C) gravity only measures magnetic fields

(D) different rock types have different densities

12. Olivine group of minerals is rich in

(A) Mg and Fe silicates

(B) Al and K

(C) Ca and CO_3

(D) Na and Cl

13. Uniaxial minerals, which have a single optic axis, crystallize in which of the following crystal systems?

(A) Isometric

(B) Tetragonal and hexagonal

(C) Tetragonal and monoclinic

(D) Hexagonal and orthorhombic

14. Kyanite, andalusite and sillimanite are naturally occurring anhydrous aluminum silicate minerals having the same chemical formula, Al_2SiO_5, but with differing crystal structures. Therefore they are categorized as

(A) polymorphous series

(B) isomorphous series

(C) pseudomorphous series

(D) All of the above

15. Which sedimentary structure is indicative of paleocurrent direction?

(A) Cross-bedding

(B) Concretion

(C) Bioturbation

(D) Graded bedding

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16. Diamond-bearing kimberlites usually occur as

(A) stratiform sheets

(B) cylindrical pipes

(C) disseminated bodies

(D) veins

17. Pillow structures in basalt are formed due to

(A) magma mixing

(B) assimilation of sediments

(C) volatile escape

(D) cooling underwater

18. Breccia is a clastic rock composed of _____ cemented together by a finegrained matrix.

(A) rounded gravel-sized clasts

(B) silt-sized clasts

(C) angular gravel-sized clasts

(D) sand-sized clasts

19. The Bushveld Igneous Complex of South Africa contains the largest reserves of

(A) platinum group elements (PGEs)

(B) lead-zinc deposits

(C) bauxite ores

(D) manganese nodules

20. Skarn deposits are formed by which one of the following processes?

(A) Magmatic crystallization of ultramafic rocks

(B) Metamorphic replacement

(C) Contact metamorphism between intrusive and carbonates

(D) Volcanogenic massive sulfide deposit

21. Mid-oceanic ridges, which are vast underwater mountain chains formed by tectonic plates, are typical features of

(A) divergent boundaries

(B) convergent boundaries

(C) transform boundaries

(D) hotspots

22. The Himalayan mountain belt was formed due to

(A) ocean-ocean convergence

(B) ocean-continent convergence

(C) continent-continent collision

(D) transform faulting

23. A folded structure in which both the hinge line and the axial surface are almost horizontal is known as

(A) upright fold

(B) reclined fold

(C) vertical fold

(D) recumbent fold

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24. The degree of obliquity of a fault, which is the angle between the strike of the fault plane and the slip vector (striation) is known as

(A) plunge

(B) pitch

(C) dip

(D) hade

25. A discontinuity structure with wall-parallel displacement dominated by brittle deformation mechanisms is known as

(A) fault

(B) fracture

(C) joint

(D) All of the above

26. A sub-cylindrical fold with only one inclined limb is known as

(A) isoclinal fold

(B) monoclinal fold

(C) overturned fold

(D) upright fold

27. The main stages of coalification in order of increasing rank are

(A) lignite → sub-bituminous → bituminous → anthracite → graphite

(B) bituminous → lignite → anthracite → graphite

(C) peat → anthracite → bituminous → lignite

(D) peat → lignite → bituminous → anthracite

28. Sedimentary basins in India are classified on the basis of the maturity of the contained hydrocarbon resources. Identify the category into which the Assam shelf is classified.

(A) Category-I

(B) Category-II

(C) Category-III

(D) None of the above

29. Which geological formation in India contains the maximum amount of coal deposits?

(A) Barail formation

(B) Barakar formation

(C) Raniganj formation

(D) Kamthi formation

30. Identify the incorrect statement.

(A) Ophiolites are the remnants of the earth's ancient oceanic crust and the upper mantle.

(B) Ophiolites are found in the Belt of Schuppen.

(C) Ophiolites are emplaced onto continental crust.

(D) Ophiolites are found in the Indo-Myanmar Mobile Belt.

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31. What is the type of uranium deposit occurring in Domiasiat, Meghalaya?

(A) Granite-hosted deposit

(B) Unconformity-related deposit

(C) Sandstone-type uranium deposit

(D) Volcanic-hosted deposit

32. The tertiary coal deposits of Assam are characterized by

(A) high ash and high volatile content

(B) high ash and high sulfur content

(C) low sulfur and low ash content

(D) low ash and high sulfur content

33. The specific yield of an aquifer is defined as the

(A) ratio of water stored to total rock volume

(B) volume of water that drains freely under gravity per unit volume of aquifer

(C) volume of water retained after drainage

(D) rate of water movement

34. An aquifer which is partly confined by semi-permeable layers through which leakage occurs is called a/an

(A) perched aquifer

(B) artesian aquifer

(C) semi-confined aquifer

(D) fractured aquifer

35. In the hydrologic cycle, the process of infiltration refers to

(A) water entering the soil surface

(B) water moving over land surface

(C) water vapour condensing into clouds

(D) water stored in glaciers

36. Which one of the following is ***not*** a non-point source of water pollution?

(A) Presence of heavy metals in groundwater

(B) Wastewater discharge in an industrial belt

(C) Pathogens in a storm-water drainage system

(D) Oil spills in the ocean

37. Basaltic magmas are generally enriched in

(A) SiO_2 and K_2O

(B) Na_2O and Al_2O_3

(C) CO_2 and SO_2

(D) MgO and FeO

38. Isotopic fractionation is more pronounced at

(A) high temperatures

(B) constant pressure

(C) No phase change

(D) low temperatures

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39. Mid-Oceanic Ridge Basalt (MORB) is characterized by

(A) high K and high Sr content

(B) flat REE pattern with slight LREE depletion

(C) enriched LREE and HFSE

(D) negative εNd values

40. Komatiites are significant because they

(A) are products of modern subduction zones

(B) indicate very high mantle temperatures in the archean

(C) form exclusively in continental rift basins

(D) are restricted to phanerozoic times

41. The principle of faunal succession was first clearly stated by

(A) Charles Lyell

(B) William Smith

(C) James Hutton

(D) Charles Darwin

42. The mineral assemblage glaucophane + lawsonite is diagnostic of

(A) granulite facies

(B) eclogite facies

(C) blueschist facies

(D) hornfels facies

43. The first index mineral in Barrovian sequence is

(A) chlorite

(B) kyanite

(C) sillimanite

(D) staurolite

44. A clockwise P-T-t path generally indicates

(A) rapid exhumation

(B) burial followed by heating and then decompression

(C) isobaric cooling

(D) tectonic quiescence

45. Fluids in metamorphism primarily

(A) promote recrystallization and metasomatism

(B) suppress reactions

(C) lower geothermal gradients

(D) increase mechanical strength

46. The Proterozoic Cuddapah Basin of South India is an example of

(A) Rift basin

(B) Intracratonic basin

(C) Back-arc basin

(D) Trench basin

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47. The Triassic succession of Spiti is classified as

(A) Gondwana Group

(B) Lilang Group

(C) Karewa Group

(D) Rajmahal Group

48. The Cretaceous-Tertiary (K-T) boundary in India is closely linked with

(A) Rajmahal volcanism

(B) Deccan volcanism

(C) Vindhyan sedimentation

(D) Himalayan orogeny

49. The most prolific hydrocarbon basin of India is

(A) Assam-Arakan Basin

(B) Vindhyan Basin

(C) Bombay Offshore Basin

(D) Gondwana Basin

50. The depletion of the ozone layer is mainly caused due to

(A) carbon dioxide

(B) nitrogen oxide

(C) sulphur dioxide

(D) chlorofluorocarbon

51. Which of the following is a direct effect of global warming on oceans?

(A) Ocean acidification

(B) Increased salinity everywhere

(C) Decreased water temperature

(D) Formation of new land masses

52. Talus cones at the base of steep slopes are formed by

(A) rock creep

(B) rockfall

(C) slump

(D) earthflow

53. Permafrost melting due to global warming releases which harmful gas?

(A) Methane (CH_4)

(B) Nitrogen (N_2)

(C) Hydrogen (H_2)

(D) Helium (He)

54. Which of the following is a planar structure in rocks?

(A) Fold axis

(B) Lineation

(C) Foliation

(D) Mineral lineation

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55. Which layer of the atmosphere contains the ozone layer?

(A) Troposphere

(B) Mesosphere

(C) Thermosphere

(D) Stratosphere

56. Which type of rock is generally considered most suitable for landfill liners?

(A) Sandstone

(B) Clay

(C) Limestone

(D) Granite

57. Ore bodies that occur parallel to the existing rock-bedding of the host rock are called

(A) concordant ore bodies

(B) discordant ore bodies

(C) massive ore bodies

(D) disseminated ore bodies

58. The term 'Gangue' in an ore deposit refers to

(A) valuable metallic part of the ore

(B) trace impurities within a crystal lattice

(C) minerals used as gemstones

(D) unwanted minerals associated with the ore

59. The concept of 'sustainable development' in geology primarily means

(A) using resources at a rate faster than replenishment

(B) balancing present resource use without compromising future needs

(C) complete ban on mineral exploitation

(D) converting all fossil fuels to renewable energy

60. The Richter Scale, also known as Gutenberg Richter Scale, is used to measure

(A) earthquake magnitude

(B) earthquake intensity

(C) seismic wave speed

(D) seismic wave frequency

61. The lithology of the Sylhet Trap of Shillong Plateau is dominantly composed of

(A) felsic igneous rocks

(B) ultramafics

(C) subalkaline tholeiitic basaltic lava flows

(D) rhyolitic lava flows

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62. What type of fossil is petrified wood?

(A) Replacement fossil

(B) Carbonization

(C) Amber preservation

(D) Mold fossil

63. The fundamental chronostratigraphic unit is

(A) stage

(B) formation

(C) bed

(D) member

64. When minerals fill the pores of organic remains without replacing the original material, it is called

(A) permineralization

(B) carbonization

(C) cast formation

(D) amber entrapment

65. For what reason are ultrabasic rocks considered as favourable hosts for chromite deposits?

(A) They are silica-rich and form quartz-veins

(B) They are formed by weathering of granites

(C) They are silica deficient rocks formed at moderate temperature

(D) They are rich in Fe and Mg, allowing chromite to crystallize early

66. With which one of the following rock types is Banded Iron Formation (BIF) closely associated?

(A) Sedimentary rocks

(B) Basic and ultrabasic igneous rocks

(C) Pegmatites

(D) Lamproits

67. Pathfinder elements are used in geochemical exploration because

(A) they are ore minerals themselves

(B) they have higher atomic weights

(C) they are more mobile and indicate presence of ore minerals nearby

(D) they show strong magnetic anomalies

68. The Singhbhum-Orissa Craton is a classic metallogenic province for

(A) iron and copper mineralization

(B) bauxite deposits

(C) epithermal silver-gold veins

(D) petroleum reserves

69. Gold mining in India is mainly carried out at

(A) Kolar and Hutti (Karnataka)

(B) Singhbhum (Jharkhand)

(C) Zawar (Rajasthan)

(D) Sukinda (Odisha)

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70. Which among the following trace elements is a rare earth element?

(A) Europium

(B) Thorium

(C) Vanadium

(D) Uranium

71. What are the gases that comprise the dense atmosphere of the planet Venus?

(A) Carbon dioxide and nitrogen

(B) Carbon dioxide and oxygen

(C) Carbon dioxide and helium

(D) None of the above

72. What is the daughter element formed due to the radioactive decay of Rubidium–87?

(A) Strontium–86

(B) Strontium–87

(C) Strontium–84

(D) Lead–206

73. Which seismic waves help to determine the location of the hypocenter of earthquake?

(A) P- and S-waves

(B) L- and R-waves

(C) P- and L-waves

(D) S- and R-waves

74. The average geothermal gradient of the earth's continental crust is about

(A) 10 °C–15 °C/km

(B) 1 °C–5 °C/km

(C) 45 °C–50 °C/km

(D) 25 °C–30 °C/km

75. Which igneous texture results from very rapid cooling of lava?

(A) Phaneritic

(B) Glassy

(C) Porphyritic

(D) Pegmatitic

76. The zone of saturation refers to

(A) zone where all pores are filled with air

(B) zone where all pores are completely filled with water

(C) zone where pores are partly filled with water

(D) zone of evaporation

77. Wave ripple marks differ from current ripple marks because

(A) they are symmetric

(B) they are asymmetric

(C) they form only in deep water

(D) they are always cross-bedded

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78. Diagenesis in sandstones often leads to

(A) development of stromatolites

(B) formation of pyrite deposits in them

(C) preservation of original porosity

(D) cementation and compaction

79. A fining-upward sequence in sedimentation is most diagnostic of

(A) glacial deposits

(B) meandering river point bar sequences

(C) turbidite flows

(D) eolian dune migration

80. The accumulation of clay, iron or organic matter from upper horizons to lower horizons in a soil profile is called

(A) illuviation

(B) eluviation

(C) laterization

(D) calcification

81. The slow downslope movement of soil and rock on a slope, due to gravity is called

(A) rockfall

(B) creep

(C) landslide

(D) avalanche

82. The plasticity index of a soil is defined as the

(A) strength of the soil up to which it can be moulded

(B) moisture content of a soil up to which it will behave as a plastic material

(C) numerical difference between liquid limit and plastic limit of the soil

(D) numerical difference between the mass of wet soil and mass of the same soil after it has been dried in an electric oven at 100 °C for 24 hours

83. Which type of mining is most likely to cause subsidence of the land?

(A) Open-pit mining

(B) Placer mining

(C) Rock quarrying

(D) Hydraulic mining

84. The process of deformation of the earth's crust due to tectonic forces is called

(A) diastrophism

(B) vulcanism

(C) erosion

(D) denudation

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85. The ability of a rock to transmit water is known as

(A) porosity

(B) specific retention

(C) permeability

(D) saturation

86. Which of the following is ***not*** an aquifer material?

(A) Sand

(B) Clay

(C) Gravel

(D) Fractured limestone

87. A migmatite represents

(A) a pure metamorphic rock

(B) an igneous intrusion

(C) a hybrid rock containing both melt-derived and residuum components

(D) a sedimentary concretion

88. The primary control on sediment grain size during transport is

(A) source rock type

(B) fluid velocity

(C) diagenesis

(D) climate

89. The presence of sillimanite + K-feldspar + quartz in a pelitic rock indicates

(A) greenschist facies

(B) amphibolite facies

(C) granulite facies

(D) blueschist facies

90. Which characteristic of index fossils is used to determine the relative age of rock layers and correlate strata?

(A) Widespread distribution within a short geological time span

(B) Abundant occurrence in one locality

(C) Occurrence in precambrian rocks only

(D) Represents all living organisms

91. Which branch of palaeontology is useful in understanding fossilization processes?

(A) Taphonomy

(B) Paleobotany

(C) Ichnology

(D) Paleoecology

92. Amphibians originated during the

(A) Devonian period

(B) Triassic period

(C) Cretaceous period

(D) Paleogene period

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93. A depositional sequence in sequence stratigraphy is bounded by

(A) unconformities or their correlative conformities

(B) fossil appearances

(C) mineralogical changes as well as lithological changes

(D) isotope shifts

94. Peneplain is the characteristic landform of which stage in Davis cycle of erosion?

(A) Youth

(B) Mature

(C) Old

(D) Rejuvenation

95. When a spit grows and connects an island with the mainland, it forms a

(A) lagoon

(B) tombolo

(C) bar

(D) hook

96. Which depositional feature forms due to sub-glacial meltwater streams?

(A) Esker

(B) Cirque

(C) Horn

(D) Col

97. When a mineral appears glassy under reflected light, then the luster can be termed as

(A) resinous

(B) vitreous

(C) greasy

(D) adamantine

98. Minerals like quartz, plagioclase and calcite which have no magnetism, are classified as what materials?

(A) Paramagnetic

(B) Ferromagnetic

(C) Diamagnetic

(D) None of the above

99. Which type of silicate structure does the amphibole group of minerals possess?

(A) Sheet silicate structure

(B) Single-chain silicate structure

(C) Double-chain silicate structure

(D) Single tetrahedral structure

100. The degree of partial melting primarily controls

(A) pressure of metamorphism

(B) type of tectonic deformation

(C) composition of melt

(D) isotopic resetting

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