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19211

120 MINUTES

1. The slowest moving of the seismic waves
A) S B) P C) Surface D) PS
2. On the Richter scale, a 5.0 earthquake is ---- times stronger than a 4.0 earthquake, and ----- times stronger than a 3.0 earthquake.
A) 10, 100 B) 2, 4 C) 1, 10 D) 100, 10
3. In which group are the spheres of the Earth listed in order of increasing density?
A) atmosphere, hydrosphere, lithosphere
B) hydrosphere, lithosphere, atmosphere
C) lithosphere, hydrosphere, atmosphere
D) lithosphere, atmosphere, hydrosphere
4. More than 70% of the total heat lost by Earth is lost through
A) Volcanoes B) Earthquakes C) Seafloor D) Faults
5. The height reference surface that most closely approximates all the Earth's oceans.
A) Oblate ellipsoid B) Prolate ellipsoid
C) Geoid D) Spheroid
6. Negative magnetic anomaly could be caused by the presence of underlying
A) Graben B) Granite C) Magnetite D) Gabbro
7. Like tree-rings, ----- can be used as a relative dating technique to roughly estimate the amount of time that a lake has existed
A) Basalt flows B) Varves
C) Stylolites D) Cross-bedding
8. Which of the following statements relate to Davis Cycle of Erosion?
a. Erosion starts when upliftment stops b. Peniplain is the end product
c. Long crustal stability after initial uplift d. Endrumpf is the end product

A) a & b only B) a, b, & d only
C) a, b, c, d D) a, b, & c only
9. Regions separating the river valleys where mostly overland flow occurs and no clear drainage pattern is established
A) Drainage divide B) Interfluve
C) Thalweg D) Arete
10. Which statement best describes sediments deposited by glaciers and rivers?
A) Glacial deposits and river deposits are both sorted
B) Glacial deposits are sorted, and river deposits are unsorted
C) Glacial deposits are unsorted, and river deposits are sorted
D) Glacial deposits and river deposits are both unsorted

11. Rann of Kutch is an example of:
 - A) Intermountain basin
 - B) Palaeolake
 - C) Playa
 - D) Salt water lake

12. Increasing $\delta^{16}\text{O}$ values from negative to positive numbers in older to younger soil carbonates of the Siwaliks indicate
 - A) Reduced rainfall
 - B) Increased rainfall
 - C) Lack of rainfall
 - D) Increased evaporation

13. The evidence for Big Bang is that the universe is
 - A) contracting and has a pervasive background radiation of 2.7 K below absolute zero
 - B) expanding and has a pervasive background radiation of 2.7 K above absolute zero
 - C) pulsating and has remained without any change of background radiation
 - D) contracting and background radiation is erratic

14. Olympus Mons is three times the height of Mount Everest and its caldera is more than 90 kilometers wide. Where is it located?
 - A) Mars
 - B) Marianas Trench
 - C) Moon
 - D) Venus

15. Most comets come from a spherical region over a thousand times farther from the Sun than Pluto. This remote zone is called the -----.
 - A) Milky way
 - B) Black hole
 - C) Oort cloud
 - D) Asteroid belt

16. Kamacite and taenite are mineral constituents of
 - A) Stony meteorites
 - B) Iron meteorites
 - C) Stony-iron meteorites
 - D) Mesosiderites

17. Most of the Earth's surface ocean currents are caused by
 - A) stream flow from continents
 - B) differences in ocean-water density
 - C) the revolution of the Earth
 - D) the prevailing winds

18. Oceanic and continental crust differ in
 - A) composition
 - B) density
 - C) thickness
 - D) all of the above

19. Barrier islands form
 - A) on gently sloping continental shelves with abundant sand in areas where both tidal fluctuations and wave-energy levels are low
 - B) on continental rise, with high levels of wave energy and tidal range
 - C) around atolls, with deep waters and no sediment supply
 - D) on drowned coasts

20. An earthquake's P-wave travelled 4,800 kilometers and arrived at a seismic station at evening 5:10. At approximately what time did the earthquake occur?
 - A) 5:02 PM
 - B) 5:08 PM
 - C) 5:10 PM
 - D) 5:18 PM

21. Rising levels of atmospheric carbon dioxide will cause which of the following changes in oceanic chemistry?
- A) Increased precipitation of calcium carbonate
 B) Decreased pH
 C) Decreased salinity
 D) Increased salinity
22. The most productive areas of the ocean?
- A) Estuaries
 B) Deep Open Ocean
 C) Coastal Downwelling Regions
 D) Coastal Upwelling Regions
23. Characteristic clay mineral of chemical weathering in subtropical, rainy climate
- A) Illite B) Smectite C) Palygorskite D) Kaolinite
24. Which amongst the following is not a carbonate ooze?
- A) foraminifera B) dinoflagellate
 C) coccolithophorids D) pteropods
25. Higher contents of dissolved oxygen does not match which amongst these?
- A) Less salinity B) More photosynthesis
 C) Higher mineral content D) Lower temperature
26. $a \neq b \neq c, \alpha = \beta = \gamma = 90^\circ$ represents the crystal system of
- A) Isometric B) Tetragonal
 C) Orthorhombic D) Monoclinic
27. The number of primitive space lattices
- A) 7 B) 3 C) 10 D) 1
28. Co-ordination number of a crystalline solid is
- A) Number of particles in the unit cell
 B) Number of nearest neighbours of a particle
 C) Number of octahedral voids in a unit cell
 D) Number of tetrahedral voids in a unit cell
29. Which of the following is a crystalline solid?
- A) Copper wire B) Glass bottle
 C) Polythene bag D) Rubber ball
30. The smallest portion of a crystal which when repeated in different directions generates the entire crystal
- A) Lattice points B) Crystal lattice
 C) Unit cell D) None of the mentioned
31. The crystal system of biotite
- A) Cubic B) Hexagonal
 C) Orthorhombic D) Monoclinic

32. Match group I with group II

Group I

- a. Olivine
- b. Quartz
- c. Epidote
- d. Biotite

Group II

- 1. Nesosilicate
- 2. Tectosilicate
- 3. Sorosilicate
- 4. Phyllosilicate

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

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

33. A snow ball garnet represents

- A) Post-kinematic mineral growth
- B) Pre-kinematic mineral growth
- C) Syn-kinematic mineral growth
- D) Non-kinematic mineral growth

34. Which amongst the following is strongly pleochroic?

- A) Muscovite
- B) Quartz
- C) Orthoclase
- D) Hornblende

35. Total number of Bravais lattices

- A) 12
- B) 13
- C) 14
- D) 16

36. Which is correctly matched?

- A) Sillimanite – Monoclinic
- B) Orthoclase – High relief
- C) Pyroxene – Near orthogonal cleavage
- D) Garnet – Basal cleavage

37. Match the correct items

Group I

- a. XRF
- b. XRD
- c. ICP
- d. EPMA

Group II

- 1. Spot analysis
- 2. Structure
- 3. Solution-based
- 4. Chemistry of powder

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

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

38. Most rock forming minerals are

- A) silicates and oxides
- B) sulphides and oxides
- C) silicates and sulphides
- D) oxides and hydroxides

39. Monazite is a

- A) variety of igneous rock
- B) phosphate of Th, Y, La, Ce
- C) oxide of Th, Y, La, Ce
- D) variety of metamorphic rock

40. In Moh's hardness scale the hardest oxide is

- A) Diamond
- B) Corundum
- C) Quartz
- D) Topaz

41. Indicatrix of uniaxial +ve mineral is
 A) sphere B) ellipsoid
 C) oblate spheroid D) prolate spheroid
42. Calc-alkaline basalts are
 A) high k-basalts B) low k-basalts
 C) low alumina basalts D) high alumina basalts
43. Match the following
- | <u>Group I</u> | | <u>Group II</u> | |
|----------------|----------|-----------------|----------|
| a. | Granite | 1. | Dacite |
| b. | Tonalite | 2. | Andesite |
| c. | Syenite | 3. | Trachyte |
| d. | Diorite | 4. | Rhyolite |
- A) a-3, b-1, c-2, d-4 B) a-4, b-1, c-3, d-2
 C) a-4, b-2, c-3, d-1 D) a-1, b-4, c-3, d-2
44. Match the rock and mineral assemblage
- | <u>Group I</u> | | <u>Group II</u> | |
|----------------|--------------|-----------------|-----------------------------|
| a. | Granodiorite | 1. | Hornblende – plagioclase |
| b. | Harzburgite | 2. | Plagioclase – Quartz |
| c. | Gabbro | 3. | Olivine – Orthopyroxene |
| d. | Diorite | 4. | Clinopyroxene – Plagioclase |
- A) a-2, b-3, c-4, d-1 B) a-3, b-4, c-1, d-2
 C) a-4, b-1, c-3, d-2 D) a-1, b-3, c-2, d-4
45. Ophiolite sequence top to bottom
 A) Radiolarian chert – pillow basalt – dolerite dyke – gabbro – peridotite
 B) Peridotite – pillow basalt – gabbro – dolerite dyke – radiolarian chert
 C) Pillow basalt – radiolarian chert – dolerite dyke – gabbro – peridotite
 D) Gabbro – pillow basalt – dolerite dyke – radiolarian chert – peridotite
46. The differentiation index is the sum of weight percentages of the normative minerals
 A) Quartz + orthoclase + albite + nepheline + leucite + kalsilite
 B) Sum of any three of the above
 C) Sum of any two
 D) Sum of (Quartz + Orthoclase + Albite + Leucite)
47. A phaneritic igneous rock with orthoclase, oligoclase, biotite, hornblende, and quartz
 A) monzonite B) syenite C) latite D) granodiorite
48. Which of the following shows complete solid solution series?
 A) Albite – Anorthite B) Forsterite – Fayalite
 C) Diopside – Anorthite D) Both A and B

75. Match the bivalves in I with their ecology in II
- | <u>Group I</u> | | <u>Group II</u> | |
|----------------|---------|-----------------|------------------|
| a. | Mytilus | 1. | Cemented |
| b. | Pecten | 2. | Swimmer |
| c. | Ostrea | 3. | Bysally attached |
| d. | Mya | 4. | Infaunal |
- A) a-1, b-2, c-3, d-4 B) a-3, b-2, c-1, d-4
 C) a-3, b-1, c-4, d-2 D) a-2, b-1, c-4, d-3
76. Dinosaurs are distinct from other Mesozoic reptiles by
- A) Large size B) Carnivorous nature
 C) Erect stance D) Sprawling
77. Shortest geological range is for which of the following?
- A) Brachiopod B) Pelecypod C) Trilobites D) Conodonts
78. Ediacaran fossils are important in
- A) Archaen Proterozoic Boundary
 B) Permian Triassic
 C) Cretaceous Tertiary
 D) Precambrian Cambrian
79. A regular echinoid
- A) Micraster B) Cidaris C) Phymosoma D) Both B and C
80. Match the following
- | <u>Group I</u> | | <u>Group II</u> | |
|----------------|--------------|-----------------|---------------------|
| a. | Cidaris | 1. | Trilobites |
| b. | Calymene | 2. | Gastropoda |
| c. | Natica | 3. | Irregular echinoids |
| d. | Lopidechinus | 4. | Regular echinoid |
- A) a-4, b-1, c-2, d-3 B) a-1, b-2, c-3, d-4
 C) a-4, b-3, c-1, d-2 D) a-1, b-2, c-4, d-3
81. Most favourable environment to preserve fossils
- A) Terrestrial B) Lacustrine C) Fluvial D) Maritime
82. The chambered part of cephalopods
- A) Body whorl B) Phragmacone
 C) Siphuncle D) Aperture
83. The theory of punctuated equilibrium was proposed by
- A) James Hutton and Charles Lyell
 B) Stephen Gould and Niles Eldredge
 C) Charles Darwin and Russell Wallace
 D) Smith and Steno

84. Match the following
- | <u>Group I</u> | | <u>Group II</u> | |
|----------------|------------------|-----------------|-----------------|
| a. | Muschelkalk | 1. | Middle Triassic |
| b. | Katrol formation | 2. | Miocene |
| c. | Uttathur stage | 3. | Cretaceous |
| d. | Baripada beds | 4. | Late Jurassic |
- A) a-1, b-4, c-3, d-2 B) a-2, b-1, c-3, d-4
 C) a-4, b-1, c-3, d-2 D) a-1, b-3, c-2, d-4
85. The correct sequence of thrusts in the Himalayas, south to north.
 A) Krol – Ramgarh – Almora – ITSZ
 B) Ramgarh – Krol – Almora – ITSZ
 C) Krol – Almora – Ramgarh – ITSZ
 D) Almora – Ramgarh – ITSZ – Krol
86. Age of most of the bituminous coal seams in India
 A) Silurian B) Miocene C) Carboniferous D) Permian
87. Arrange from younger to older
- | | | | |
|----|--------------------|----|-----------------|
| a. | Jodhpur sandstone | b. | Cambay shale |
| c. | Kajrahat Limestone | d. | Tipam sandstone |
- A) c, a, b, d B) a, b, c, d C) d, b, a, c D) a, d, c, b
88. The most fossiliferous bed in Siwalik Himalayas
 A) Nagri B) Kamlial C) Dhokpathan D) Chingi
89. The characteristic flora of Middle Gondwana is
 A) Glossopteris B) Ptilophyllum C) Dichroidium D) Gangamopteris
90. Age of Deccan Traps
 A) Cretaceous B) Precambrian C) Jurassic D) Triassic
91. The Sargur schist complex is
 A) Older than Dharwars
 B) Younger than Dharwars
 C) Equivalent to Closepet granite
 D) Younger than Papaghni
92. Walther's Law
 A) involves paleobotany and involves the depth and temperatures of sea water
 B) establishes the geochemical signature of different formations
 C) proposes that the vertical progression of facies should be the same as corresponding lateral facies changes
 D) differentiates between clay minerals and carbonates.
93. On a toposheet (scale 1:50,000) a bed is 5 cm. The actual ground thickness in kilometre will be:
 A) 2 B) 2.5 C) 4 D) 5

106. Gossans are developed due to
 A) Reduction of oxides
 B) Oxidation of sulphides
 C) Oxidation of sulphides and oxides
 D) Reduction of oxides and sulphides
107. Which of the following does not belong to lower Gondwana?
 A) Raniganj B) Talchir C) Singareni D) Chikiala
108. Cassiterite is an ore of
 A) Tin B) Copper C) Antimony D) Tungsten
109. In India graphite deposits are usually associated with
 A) Khondalites B) Charnockites C) Kodurites D) Granites
110. Which of the following is not a carbonate?
 A) Rhodocrosite B) Smithsonite C) Witherite D) Celestite
111. Limestone is a ----- rock in Bombay high
 A) Source B) Cap C) Reservoir D) Both B and C
112. Crude oil containing <1% sulphur and density below 0.85 is
 A) Paraffinic – naphthene B) Paraffinic
 C) Aromatic D) Asphaltic
113. *Ocimum centraliafricanum* is an indicator plant of
 A) Fe B) Mg C) Cu D) U
114. What are the units on the y-axis of a seismic profile?
 A) Time B) Two-way time
 C) Distance D) Depth
115. The codes of the highest category of mineral resources and the lowest category of mineral resources respectively under the UNFC system are
 A) (111) and (334) B) (121) and (333)
 C) (321) and (111) D) (222) and (332)
116. Geophones are used in seismic exploration for
 A) Producing seismic energy
 B) Recording reflected seismic energy
 C) Keeping the field workers in contact with each other
 D) To monitor distance
117. Which space-borne satellite programme has a goal of improving understanding of the Earth –Sun system and its response to natural and human induced changes?
 A) Earth Observing System B) High Resolution Sensor
 C) Land Sat D) Spot

118. Energy that is not seen by eyes and is recorded from surface of Earth is called
A) Zonal energy B) Meridian energy
C) Infrared energy D) False energy
119. Sensor IFOV is proportional to
A) \sin^2 B) \cos^2 C) \sec^2 D) \tan^2
120. Altitude of geostationary satellites
A) 10,000 km B) 26,000 km C) 36,000 km D) 50,000 km
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