

1. Which one of the followings is secondary pollutant?
(A) SO_2 (B) NO_x
(C) O_3 (D) Hydrocarbons
(E) Answer not known

2. The correct statement of comparison of ultimate BOD, COD, theoretical oxygen demand and 5-day BOD (BOD_5) is
(A) $\text{BOD}_U > \text{COD} > \text{ThOD} > \text{BOD}_5$
(B) $\text{COD} > \text{ThOD} > \text{BOD}_U > \text{BOD}_5$
(C) $\text{ThOD} > \text{COD} > \text{BOD}_U > \text{BOD}_5$
(D) $\text{COD} > \text{BOD}_U > \text{BOD}_5 > \text{ThOD}$
(E) Answer not known

3. Which is category B project in EIA?
(A) Steel production (B) Copper production
(C) Granite production (D) Coal production
(E) Answer not known

4. Which is not qualification of Rescue station Superintendent?
(A) Rescue trained person
(B) Unrestricted first class manager's certificate
(C) 5 years of below ground experience
(D) Unrestricted second class manager's certificate
(E) Answer not known

5. In acid mine drainage microorganism inhibition means
- (A) Applying biocides (B) Applying fungi
(C) Applying larvae (D) Applying microbes
(E) Answer not known
6. Which of the following does not constitute a land impact monitoring?
- (A) Soil monitoring (B) Slope stability monitoring
(C) Hill/Mountain monitoring (D) Subsidence monitoring
(E) Answer not known
7. The model that does not explain the dispersion of air pollutant is
- (A) Gaussian (B) Boxed
(C) Lagrangian (D) Eulerian
(E) Answer not known
8. The major problem of volatile organic compounds is their ability to create
- (A) Photochemical smog (B) Smog
(C) Smoke (D) Dispersion
(E) Answer not known

9. In a mine emergency notification plan the two types of messages are
- (A) Action messages and warning messages
 - (B) Action messages and mandatory messages
 - (C) Action messages and urgent messages
 - (D) Action messages and caution messages
 - (E) Answer not known
10. The respiratory quotient is the ratio between (between CO₂ exhaled and O₂ inhaled)
- (A) CO₂/O₂
 - (B) O₂CO₂
 - (C) O₂/[CO₂ . N₂]
 - (D) (CO₂.N₂)/O₂
 - (E) Answer not known
11. A cationic and a anionic heavy metal can be
- (A) Zn-Cd
 - (B) Cu-Se
 - (C) Mn-Ni
 - (D) Cr-Hg
 - (E) Answer not known
12. The oldest and most important method of artificial respiration by hand is
- (A) Holger-Nielsenback pressure method
 - (B) Manual method
 - (C) Sylvester method
 - (D) Inflation method
 - (E) Answer not known

13. The S.I. unit of illuminance in the S.I. system is
- (A) lumens /cm² (B) lux(lx)
(C) candella (D) lumens /ft²
(E) Answer not known
14. The catalyst used in filter self rescuer to convert CO to CO₂ is
- (A) Silica gel (B) Li.Br
(C) Hopcalite (D) Activated charcoal
(E) Answer not known
15. Flame safety lamp is used for testing
- (A) CO (B) CO₂
(C) CH₄ (D) H₂S
(E) Answer not known
16. Which parameter primarily influences the Peak Particle Velocity (PPV) of ground vibration caused by blasting in open cast mines?
- (A) Blast hole diameter (B) Charge weight per delay
(C) Bench height (D) Spacing between blast hole
(E) Answer not known
17. The device, which can be used to control gaseous as well as particulate pollutants, in the industrial emissions, is known as
- (A) Cyclone separator (B) Spray tower
(C) Dynamic precipitator (D) Fabric filter
(E) Answer not known

18. The ultimate BOD value of a waste
- (A) Increase with temperature
 - (B) Decrease with temperature
 - (C) Remains the same at all temperature
 - (D) Double with every 10°C rise in temperature
 - (E) Answer not known
19. To minimize the air pollution problem, residential buildings in the mining areas should be located in
- (A) Downward direction of predominant wind direction
 - (B) Upward direction of predominant wind direction
 - (C) Perpendicular to predominant wind direction
 - (D) At any place away from the mine
 - (E) Answer not known
20. What is the maximum distance at which working to stopped it water logged-area same mine or adjoining mine?
- (A) 30 m
 - (B) 45 m
 - (C) 60 m
 - (D) 75 m
 - (E) Answer not known
21. Why a layer of coal is left against the shaley roof?
- (A) Shaley roof has the tendency to depart from immediate coal roof
 - (B) It makes the roof weaker
 - (C) To avoid subsidence
 - (D) To restrict inrush of water
 - (E) Answer not known

22. What is the name of device used in a shaft exceeding 100 m depth to prevent over speeding and over winding?
- (A) Automatic speed indicator (B) Automatic contrivance
(C) Automatic depth indicator (D) Automatic brake
(E) Answer not known
23. Where explosive is below ground mine stored?
- (A) Magazine (B) Reserve station
(C) Rescue station (D) Pump station
(E) Answer not known
24. For oil fire, which extinguisher to be used?
- (A) Soda-acid (B) Water
(C) Foam (D) CO₂
(E) Answer not known
25. Which is not occupational disease in mining industry?
- (A) Silicosis (B) Pneumoconiosis
(C) Musculoskeletal injuries (D) Blindness
(E) Answer not known
26. Social Impact Assessment study should be completed in
- (A) 1 month (B) 3 months
(C) 3 weeks (D) 6 months
(E) Answer not known

27. As per Mines Rescue Rules 1985, the legible tracings of the mine shall be kept up-to date within a period of
- (A) 1 month (B) 6 months
(C) 3 months (D) 11 months
(E) Answer not known
28. As per Mines Rescue Rules 1985, the number of rescue trained people in a rescue station must be
- (A) 18 (B) 36
(C) 9 (D) 27
(E) Answer not known
29. As per Metalliferous Mines Regulations 1961, in a haulage roadway man holes shall be provided in a interval of
- (A) 10 meters (B) 20 meters
(C) 30 meters (D) 15 meters
(E) Answer not known
30. As per Metalliferous Mines Regulations 1961 – The ratio between the rope diameter and winding engine diameter shall be of the ratio.
- (A) 100 : 1 (B) 80 : 1
(C) 50 : 1 (D) 75 : 1
(E) Answer not known

31. As per Mines Act 1952, inclusive of overtime, the maximum hours a person, can work in a mine is
- (A) 10 hours (B) 12 hours
(C) 8 hours (D) 14 hours
(E) Answer not known
32. As per Mines Act 1952, the maximum number of days a person shall work in a mine is
- (A) 5 days (B) 6 days
(C) 4 days (D) 7 days
(E) Answer not known
33. As per Mines Act 1952, week means a period of
- (A) 5 days
(B) 6 days
(C) 7 days
(D) Depending on working days of the mine
(E) Answer not known
34. As per coal mines regulations the maximum wet bulb temperature in any working place shall not exceed
- (A) 33.5°C (B) 33.0°C
(C) 34.0°C (D) 32.5°C
(E) Answer not known

35. As per Coal Mines Regulations, a winding equipment shall be examined once in every
- (A) 12 hours (B) 24 hours
(C) 48 hours (D) 6 hours
(E) Answer not known
36. As per Coal Mines Regulations, for an examination to be conducted by the board, an application shall be submitted not less than (before the examination date)
- (A) 90 days (B) 30 days
(C) 60 days (D) 15 days
(E) Answer not known
37. As per CMR 1957, shot firer is a
- (A) Competent person (B) Official
(C) Officer (D) Permit Manager
(E) Answer not known
38. A belowground mine having 60 ordinarily employment, it is required as per MMR 1961.
- (A) First class manager
(B) Second class manager
(C) Either first class or second class manager
(D) Neither first class nor second class manager
(E) Answer not known

39. As per MMR 1961, no winding rope shall be used in a shaft exceeding 1500 m in depth if its safety factor is less than
- (A) 2 (B) 3
(C) 4 (D) 5
(E) Answer not known
40. Which of the following limit of work near mine boundaries is permitted under CMR 1957?
- (A) Upto a distance equal to half of the distance specified in column 5 of regulation 99
(B) Upto 90 m of the last face
(C) Upto a prominent fault plane
(D) Upto a boundary of neighbouring mine
(E) Answer not known
41. Which of the following parameters are essential about the quality of irrigation water studies?
- (1) Total dissolved solids
(2) Chloride ions
(3) Residual carbonates
- (A) (1) only
(B) (1) and (3) only
(C) (1) and (2) only
(D) (2) and (3) only
(E) Answer not known

42. Which of the following statements are true about the advantages of open wells?
- (i) Storage capacity of the water is available in the well itself
 - (ii) Large space is required for well for excavated material lying on the surface as mound
 - (iii) Can be operated by centrifugal pump at different setting in low and high water levels.
- (A) (i) only
 - (B) (i) and (iii) only
 - (C) (i) and (ii) only
 - (D) (ii) and (iii) only
 - (E) Answer not known
43. Which rock acts as an aquiclude?
- (A) Sandstone
 - (B) Shale
 - (C) Vesicular basalt
 - (D) Fracture granite
 - (E) Answer not known

44. Match the following :

1. Nitrate – Dissolution of (Fe) bearing rocks
2. Fluoride – Natural geogenic contamination
3. Arsenic – Natural occurrence in rocks
4. Iron – Excessive used of fertilizers

- (A) 4, 2, 3, 1
(B) 3, 2, 1, 4
(C) 4, 3, 2, 1
(D) 2, 1, 4, 3
(E) Answer not known

45. Ditch and furrow method is best suited for

- (A) Quick recharge of confined aquifer
(B) Quick surface storage
(C) Shallow unconfined aquifer recharge
(D) Induced recharge across river banks
(E) Answer not known

46. Choose the right matches among type.
1. Confined – Bounded by aquicludes, under pressure
 2. Perched – Leaky aquifer bounded by aquitards
 3. Unconfined – Water table as upper boundary
 4. Artesian – Local saturation above main water table
- (A) 1 and 2 are correct
(B) 1 and 3 are correct
(C) 2 and 4 are correct
(D) 3 and 4 are correct
(E) Answer not known
47. Specific yield of coarse sand is approximately
- (A) 5-10% (B) 10-20%
(C) 20-30% (D) 30-35%
(E) Answer not known
48. The hydraulic gradient is expressed as
- (A) h/l (B) $k \times b$
(C) Q/A (D) $K \times i$
(E) Answer not known

49. According to the National Mineral Policy 2019, which of the following actions is promoted to secure the supply of critical minerals?
- (A) Complete import ban
 - (B) Mining only in SEZs
 - (C) Acquisition of mineral assets abroad
 - (D) Mineral auctions only to public sector companies
 - (E) Answer not known
50. Strategic minerals are mainly required for
- (A) Cement industry
 - (B) Construction industry
 - (C) Defence and aerospace industry
 - (D) Textile industry
 - (E) Answer not known
51. Which coal type has dark brown colour and represents the second stage in coal formation?
- (A) Anthracite
 - (B) Bituminous
 - (C) Lignite
 - (D) Sub-bituminous
 - (E) Answer not known
52. Primary property of viscosity is
- (A) The boiling point
 - (B) Resistance to flow
 - (C) Density relative to water
 - (D) Flammability
 - (E) Answer not known

53. Match the following : oil trap types and description.

- | | | | |
|----|----------------|---|--|
| 1. | Anticline trap | – | Trap where reservoir thins out completely |
| 2. | Fault trap | – | Trap caused by upward movement of salt |
| 3. | Salt dome trap | – | Trap formed when fault displaces rocks |
| 4. | Pinch out trap | – | Trap due to folding upwards of rock layers |

- (A) 1, 3, 2, 4
(B) 3, 4, 2, 1
(C) 1, 2, 3, 4
(D) 4, 3, 2, 1
(E) Answer not known

54. Assertion [A] : Kyanite is used as a refractory material.

Reason [R] : Kyanite is stable at high temperatures and has low thermal expansion

- (A) Both [A] and [R] are true and [R] is the correct explanation of [A]
(B) Both [A] and [R] are true, but [R] is not the correct explanation of [A]
(C) [A] is true but [R] is false
(D) [A] is false but [R] is true
(E) Answer not known

55. Which one is the typical vertical succession found in the bauxite deposits in Western Chotanagpur?
- (A) Laterite → Clay → Bauxite → Kaolinised trap
 - (B) Bauxite → Sandstone → Clay → Laterite
 - (C) Clay → Ferruginous Laterite → Bauxite → Porous Laterite
 - (D) Lime stone → Sand stone → Bauxite → Ferruginous soils
 - (E) Answer not known
56. Which physical property determine the quality of vermiculite upon heating?
- (A) Color variation in raw form
 - (B) Degree of exfoliation and lucture development
 - (C) Specific gravity and elasticity
 - (D) Mineral hardness
 - (E) Answer not known
57. Which of the following varieties of diamond is characterized by a spheroid aggregate with a radiated structure and is enclosed in a denser and harder surface layer?
- (A) Diamond proper
 - (B) Bort
 - (C) Balas
 - (D) Carbanado
 - (E) Answer not known

58. Assertion [A] : Sublimation deposits are commonly large and economically very important.

Reason [R] : Sublimation result in rapid deposition of bulk minerals.

- (A) Both [A] and [R] are true and [R] is the correct explanation of [A]
- (B) Both [A] and [R] are true, but [R] is not the correct explanation of [A]
- (C) [A] is true but [R] is false
- (D) [A] is false but [R] is true
- (E) Answer not known

59. _____ is a process where specific minerals in cooling magma become concentrated in certain areas.

- | | |
|--------------------------|-----------------------------|
| (A) Place concentration | (B) Hydrothermal deposition |
| (C) Magmatic segregation | (D) Residual concentration |
| (E) Answer not known | |

60. Match the following - classification of mineral deposits :

- | | |
|--------------|-------------------------|
| (a) Bauxite | 1. Hydrothermal vein |
| (b) Chromite | 2. Metamorphic |
| (c) Graphite | 3. Residual |
| (d) Gold | 4. Magmatic segregation |

- | | (a) | (b) | (c) | (d) |
|-----|------------------|-----|-----|-----|
| (A) | 4 | 3 | 2 | 1 |
| (B) | 3 | 4 | 2 | 1 |
| (C) | 1 | 3 | 4 | 2 |
| (D) | 3 | 4 | 1 | 2 |
| (E) | Answer not known | | | |

61. Arrange the following discontinuous Bowens reaction series in order in which minerals crystalize from cooling magma.

- (1) Olivine
 - (2) Clinopyroxene
 - (3) Orthopyroxene
 - (4) Amphibole
- (A) (4), (3), (2), (1)
(B) (2), (3), (1), (4)
(C) (1), (3), (2), (4)
(D) (3), (1), (4), (2)
(E) Answer not known

62. The alkali feldspar with intermediate composition, stable only at high temperature
- (A) Anorthoclase (B) Microcline
(C) Sanidine (D) Orthoclase
(E) Answer not known
63. Find out the chemical composition of Hedenbergite in pyroxene group of minerals
- (A) $\text{Ca Mg Si}_2 \text{O}_6$ (B) $\text{Ca}_2 \text{Si}_2 \text{O}_6$
(C) $\text{Mg}_2 \text{Si}_2 \text{O}_6$ (D) $\text{Ca Fe Si}_2 \text{O}_6$
(E) Answer not known
64. Give one example for Manganese-Aluminum garnet
- (A) Spessartite (B) Pyrope
(C) Grossularite (D) Almandite
(E) Answer not known
65. In all silicates except for some very rare high pressure minerals four O^{2-} anions surrounded by every Si^{4+} cation forming a
- (A) Solid solution series (B) Group
(C) Tetrahedron (D) Polymorph
(E) Answer not known

66. _____ is a quartz crystal containing spangles of Mica and hematite etc.
- (A) Aventurine quartz (B) Milky quartz
(C) Smokey quartz (D) Amethyst
(E) Answer not known
67. When light passes from one medium into another medium there is, in general an increase or decrease in its velocity and this commonly due to _____
- (A) Reflection (B) Refraction
(C) Absorption (D) Transmission
(E) Answer not known
68. The structure produced by materials such as rock salt or mobile granite which have moved upward and pierced through the overlying strata
- (A) Diapir (B) Valley bulge
(C) Gravity collapse (D) Sliding
(E) Answer not known
69. The reverse drag folds in the hanging wall of normal dip faults which are important in extensional faulting is referred as
- (A) Splay fault (B) Antithetic
(C) Rollovers (D) Synthetic fault
(E) Answer not known

70. A set of folds with small wave length is found superimposed upon folds or larger wavelength. The smaller folds which occur on the limbs or hinge of the larger folds is called as
- (A) Harmonic folds (B) Parasitic folds
(C) Disharmonic folds (D) Polyclinical folds
(E) Answer not known
71. The type of fault in which the hanging wall in a vertical section is at right angles to the strike of the fault, appears to have gone up relative to the foot wall.
- (A) Apparent thrust fault (B) Reverse fault
(C) Apparent normal fault (D) Over thrust fault
(E) Answer not known
72. _____ is the deformation caused by stress.
- (A) Shearing stress (B) Compressive stress
(C) Strain (D) Tensile
(E) Answer not known
73. The strain in a materials is proportional to the applied stress, provided the material behaves elastically is stated in _____ law.
- (A) Byerlee's (B) Shanke's
(C) Hooke's (D) Brooke's
(E) Answer not known

74. Which of the following statements are true about the factors controlling behaviour of materials at temperature
- (i) Changes in the temperature modify the strength of the rocks.
 - (ii) Plastic deformation is far less common near the surface of the earth where the confining pressure and temperature are low.
 - (iii) The fundamental strength of any materials is defined as stress which that the materials is not able to withstand regardless of time, under given physical conditions.
- (A) (i) only
 - (B) (i) and (iii) only
 - (C) (i) and (ii) only
 - (D) (ii) and (iii) only
 - (E) Answer not known
75. A recumbent fold found in mountain belts and cut by thrusts is called
- (A) Pericline
 - (B) Nappe
 - (C) Basin
 - (D) Parasitic
 - (E) Answer not known
76. The Eastern Ghats strike has a major direction of fold axes NE–SW from
- (A) The Mahanadi Valley to Krishna Valley
 - (B) Satpura range to Assam plateau
 - (C) Godavari and Mahanadi river
 - (D) Champaner to Tehri-Garhwal
 - (E) Answer not known

77. The impact of knick point migration on the tributary channel and on the rate of erosion on the Northern Tibetan plateau is exemplified by
- (A) The Ganges river (B) The Yellow river
(C) The Indus river (D) The Mahanadi river
(E) Answer not known
78. Arrange in chronological order from older to younger.
- (1) Cuddapah super group
(2) Gondwana system
(3) Tertiary formations
(4) Dharwar super group
- (A) (4), (2), (1), (3)
(B) (4), (1), (2), (3)
(C) (4), (1), (3), (2)
(D) (1), (4), (3), (2)
(E) Answer not known

79. Choose the right matches among type?
- (i) Kames – Glacial landforms
 - (ii) Drumlins – Arid landforms
 - (iii) Bazada – Fluvial landforms
 - (iv) Oxbow lake – Glacial landforms
- (A) (i) and (ii) only
(B) (iii) and (iv) only
(C) (i) and (iii) only
(D) (iv) only
(E) Answer not known
80. Which of the following landforms produced by deflation process?
- (i) Slack
 - (ii) Hammada
 - (iii) Oasis
 - (iv) Yardangs
- (A) (i) and (ii) only
(B) (i), (ii), (iii) only
(C) (i), (ii), (iii) and (iv) only
(D) (iv) only
(E) Answer not known

81. Which of the following fluvial geomorphic feature host heavy mineral concentration parallel to the river?
- (A) Alluvial fan (B) Alluvial cone
(C) Natural levee (D) Point bar
(E) Answer not known
82. Arrange the following minerals as per their resistance to weathering in increasing order.
- (1) Hornblende
(2) Biotite
(3) Olivine
(4) Augite
- (A) (3), (4), (1), (2)
(B) (3), (1), (4), (2)
(C) (4), (3), (2), (1)
(D) (4), (2), (3), (1)
(E) Answer not known
83. Spheroidal weathering typically results from
- (A) Erosion of loose sediment by wind action
(B) Combined mechanical and chemical weathering of joined rocks forming rounded blocks
(C) Exclusively chemical weathering of limestone forming karst topography
(D) Glacial abrasion forming striated surfaces
(E) Answer not known

84. In chemical weathering processes, the release of oxygen from a mineral to its surrounding environment, ions leave the mineral structure as the oxidation number of the reduced elements is decreased is defined as
- (A) Oxidation
 - (B) Reduction
 - (C) Solution
 - (D) Leaching
 - (E) Answer not known
85. It is a great shield volcano, largest of four in the Hawaiian islands of South Pacific, their spray being blown by the wind to fall as glassy threads around it is called as
- (A) Kilauea
 - (B) Mauna Loa
 - (C) Nueces ordinates
 - (D) Pompeii
 - (E) Answer not known
86. Volcanoes with periodic eruption with a little explosive activity is categorized as
- (A) Plinian type
 - (B) Pelean type
 - (C) Strombolian type
 - (D) Vesuvian type
 - (E) Answer not known

87. Siliceous deposits formed around geysers are known as
- (A) Moffetes
 - (B) Saffoni
 - (C) Siliceous sinters
 - (D) Geyserite
 - (E) Answer not known
88. The outer cone and inner cone boundary is differentiate by
- (A) Lehmann discontinuity
 - (B) Gutenberg discontinuity
 - (C) Moho discontinuity
 - (D) CMB
 - (E) Answer not known
89. The Cepheid hypothesis was proposed by
- (A) H.N. Russell
 - (B) N.N. Parisky
 - (C) C.S. Pichamuthu
 - (D) A.C. Banerji
 - (E) Answer not known

90. What is the Age of the earth by the U_{238} Radiometric dating method?
- (A) 50,000 million years
 - (B) 11,900 million years
 - (C) 4,500 million years
 - (D) 14,600 million years
 - (E) Answer not known
91. In a low pressure pneumatic transport system the air to solid ratio would be around
- (A) (300 – 400) : 1
 - (B) (200 – 300) : 1
 - (C) (100 – 200) : 1
 - (D) (50 – 100) : 1
 - (E) Answer not known
92. How conveyor width is related material transported?
- (A) 10 : 1
 - (B) 8 : 1
 - (C) 6 : 1
 - (D) 5 : 1
 - (E) Answer not known

93. For incline having 1 in 13 which method of haulage is considered?
- (A) Direct Rope haulage
 - (B) Main and Tail Rope haulage
 - (C) Endless rope haulage
 - (D) Gravity rope haulage
 - (E) Answer not known
94. Which of the following factor is not significantly related with the controlling of belt conveyor capacity?
- (A) Belt speed
 - (B) Through angle
 - (C) Belt Width
 - (D) Design of chute
 - (E) Answer not known
95. Cowl is the component of
- (A) Road header
 - (B) Shield support
 - (C) Derds
 - (D) AFC
 - (E) Answer not known

96. The term 'Head' in a pump refers to
- (A) Distance between pump motor and discharge point
 - (B) Vertical distance between suction end to discharge point
 - (C) Distance between suction end to pump impeller
 - (D) Pump impeller to discharge point
 - (E) Answer not known
97. Creepers are normally used in PIT Top/PIT Bottom layouts in a gradient of around
- (A) 1 in 5
 - (B) 1 in 10
 - (C) 1 in 15
 - (D) 1 in 2
 - (E) Answer not known
98. In a Koepe winding system, if the inertia of the friction wheel is 24 tonne meter² and if the wheel radius is 1 meter, then the mass of the wheel is
- (A) 24,000 kg
 - (B) 24,000 tonnes
 - (C) 12,000 kg
 - (D) 48,000 kg
 - (E) Answer not known

99. The number of dead turns to be provided in a winding drum, when a new rope is attached is
- (A) 1-2 turns
 - (B) 2-3 turns
 - (C) 5-6 turns
 - (D) 6-7 turns
 - (E) Answer not known
100. The compressor that is referred to as blower is
- (A) Reciprocating
 - (B) Rotary screw type
 - (C) Centrifugal
 - (D) Rotary vane type
 - (E) Answer not known
101. If the radius of a drum is 3 m and linear acceleration is 1.02 m/s^2 , then radial acceleration is
- (A) 0.34 rad/s^2
 - (B) 0.34 rad/s
 - (C) 0.34 rad/s^3
 - (D) $0.34 \text{ rad}^2/\text{s}$
 - (E) Answer not known
102. If a water pump is used to pump mercury then the head would
- (A) Increase by 13 times
 - (B) Decrease by 13 times
 - (C) Remain the same
 - (D) Reduced by 50%
 - (E) Answer not known

103. The rope type in which the wires in the strand and strands in the rope are laid in the opposite direction is called
- (A) Lang's lay
 - (B) Ordinary lay
 - (C) Stranded rope
 - (D) Non stranded rope
 - (E) Answer not known
104. Which is not safety devices is winding?
- (A) Overload limiter
 - (B) Overspeed protection
 - (C) Emergency stop switch
 - (D) Distribution plate
 - (E) Answer not known
105. Corrosion in wire rope can be minimized by
- (A) Applying proper load on it
 - (B) Operating it in an acid free site
 - (C) Proper lubrication with good quality lubricants
 - (D) Restricting dis-integration of fibres
 - (E) Answer not known
106. The type of rope haulage suitable for undulating roadways is
- (A) Direct rope haulage
 - (B) Endless rope haulage
 - (C) Gravity haulage
 - (D) Main and tail rope haulage
 - (E) Answer not known

107. The purpose of the following attachment is to eliminate the possibility of sparks and to cool down the temperature of hot gases.
- (A) Friction clutch (B) Flame trap
(C) Fluid coupling (D) Slag wool
(E) Answer not known
108. The ratio of the actual load carried by the conveyor during its running period to the nominal capacity for these hours is known as
- (A) Average loading factor (B) Nominal factor
(C) Mean factor (D) Differential factor
(E) Answer not known
109. Maximum damage to a haulage rope is caused by
- (A) Fatigue (B) Wear and tear
(C) Corrosion (D) Mine climate
(E) Answer not known
110. A 6×19 wire rope would be
- (A) 6 inches in diameter and 19 fathoms long
(B) 6 inches in circumference with 19 strands
(C) 6 strands with 19 wire in each strand
(D) 19 strands with 6 wire in each strand
(E) Answer not known

111. What is the relationship between Break Even Stripping Ratio (BESR) and Ordinary Stripping Ratio (OSR)?
- (A) $BESR < OSR$ (B) $BESR = OSR$
(C) $BESR > OSR$ (D) No relation
(E) Answer not known
112. A narrow vertical or inclined excavation made in the ore block along the width and the height of a slope to continue stopping is termed as
- (A) Trough (B) Slot
(C) Undercut (D) Ore pass
(E) Answer not known
113. Which one of the following is the most likely mode of slope failure for waste dump?
- (A) Circular (B) Wedge
(C) Plane (D) Toppling
(E) Answer not known
114. High production rates coupled with large scale and extensive subsidence results from the method of
- (A) Top slicing (B) Block caving
(C) Sublevel caving (D) VCR mining
(E) Answer not known

115. How is level interval determination depend on
- (A) Development cost
 - (B) Extraction cost
 - (C) Both development and extraction cost
 - (D) Neither development cost nor extraction cost
 - (E) Answer not known
116. Which method of stope is least cost of operations?
- (A) Square set stope
 - (B) Block caving
 - (C) Cut and fill stope
 - (D) Stull stope
 - (E) Answer not known
117. The variant form of sub level stoping is called
- (A) Open ending method
 - (B) Closed ending method
 - (C) Open/closed ending method
 - (D) Closed method
 - (E) Answer not known
118. The weight of the overlying rock plus any tectonic forces, is generally called
- (A) Overlying load
 - (B) Superincumbent load
 - (C) Immediate load
 - (D) Tectonic load
 - (E) Answer not known

119. To climb an elevation of 10 m, the access ramp in a open pit mine will have a length of (for 8% grade)
- (A) 12500 m (B) 1250 m
(C) 12.5 m (D) 125 m
(E) Answer not known
120. An integrated dust collector for a surface miner will eliminate around
- (A) 70% of dust (B) 80% of dust
(C) 90% of dust (D) 100% of dust
(E) Answer not known
121. A decline is usually sunk at a slope angle
- (A) $< 20^\circ$ (B) $> 20^\circ$
(C) $< 30^\circ$ (D) $> 30^\circ$
(E) Answer not known
122. Which of the following is not used for mucking operations in shaft sinking?
- (A) Cactus grab (B) Clam shell
(C) Backhoe (D) Raise borer
(E) Answer not known
123. A non electric detonating relay does not contain
- (A) Delay element (B) Fuse head
(C) Metal sleeve (D) Neoprene connecting tube
(E) Answer not known

124. Emulsion explosive is a mixture of
- (A) Ammonium nitrate, TNT, NG
 - (B) Ammonium nitrate, TNT, Guar Gum
 - (C) Ammonium nitrate, Water, NG
 - (D) Ammonium Nitrate, Water, Hollow Micro Balloons
 - (E) Answer not known
125. Which of the following does not govern the selection of a Hoist in an underground mine?
- (A) Depth of shaft
 - (B) Number of levels
 - (C) Production rate
 - (D) Rock type
 - (E) Answer not known
126. Commercial explosives have the velocity of detonation in the range of
- (A) 2.5 – 8.0 kilometre/second
 - (B) 1.5 – 4.0 kilometre/second
 - (C) 2.0 – 9.0 kilometre/second
 - (D) 2.5 – 10.0 kilometre/second
 - (E) Answer not known
127. The drilling method that can be used for soft, medium and hard rock formation is
- (A) Hydraulic jet
 - (B) Rotary drag bit
 - (C) Rotary roller bit
 - (D) Rotary percussion
 - (E) Answer not known

128. The primary source of energy used in traditional drilling is
- (A) Chemical
 - (B) Mechanical
 - (C) Shock
 - (D) Impact
 - (E) Answer not known
129. The factors that affect a drillhole are
- (A) Length and inclination
 - (B) Hole size, length and inclination
 - (C) Hole size, length and inter hole distances
 - (D) Hole size and length
 - (E) Answer not known
130. To make boulder or bigger size rock ratio of spacing to burden should be
- (A) More than 2
 - (B) Less than 1
 - (C) 1
 - (D) more than 1 and less than 1.5
 - (E) Answer not known
131. Which of the following gemstones are commonly found in the pegmatite belts of Tamilnadu?
- (A) Ruby and Sapphire
 - (B) Emerald, Aquamarine and Amethyst
 - (C) Diamond and Topaz
 - (D) Opal and Garnet
 - (E) Answer not known

132. In which district of Tamilnadu are Zircon – bearing sands predominantly found?
- (A) Madurai (B) Kanyakumari
(C) Salem (D) Karur
(E) Answer not known
133. Assertion [A] : The beach placers of Southern Tamilnadu are associated with Precambrian rocks.
- Reason [R] : These deposits are formed by magmatic segregation of minerals.
- (A) Both [A] and [R] are true and [R] is the correct explanation of [A]
(B) Both [A] and [R] are true and [R] is the not correct explanation of [A]
(C) [A] is true, but [R] is false
(D) Both [A] and [R] are false
(E) Answer not known
134. Which of the following rivers influences the silica sand deposits in Cuddalore district?
- (A) Ponnaiyar River (B) Kaveri River
(C) Vaigai River (D) Thamirabarani River
(E) Answer not known

135. The Temple Jewellery of Nagercoil is traditionally made using which type of stones?
- (A) Diamonds
 - (B) Kuchu Kal (Red and Green Stones)
 - (C) Sapphires
 - (D) Emeralds
 - (E) Answer not known
136. The Monazite sands of Tamilnadu coast are derived from
- (A) Charnockites
 - (B) Pegmatite's and Gneisses
 - (C) Basalts
 - (D) Lamprophyres
 - (E) Answer not known
137. The Sittampundi complex is located in which district of Tamilnadu?
- (A) Madurai
 - (B) Salem
 - (C) Coimbatore
 - (D) Tiruchirappalli
 - (E) Answer not known
138. The principal ore of aluminium found in Shevaroy hills is
- (A) Gibbsite
 - (B) Corundum
 - (C) Diaspore
 - (D) Spinel
 - (E) Answer not known

139. Match the following with correct sequence

Deposits		Ore mineral		Host Rock		Mode of occurrence
Sivaganga Graphite	(a)	Gibbsite	(1)	Garnetiferous quartzite and Granulite	(i)	Disseminated flakes
Shevaroy Bauxite	(b)	Graphite	(2)	Charnockite	(ii)	Lateritic profile
(A) (a)-(2)-(i), (b)-(1)-(ii)						
(B) (a)-(1)-(i), (b)-(2)-(ii)						
(C) (a)-(2)-(ii), (b)-(1)-(i)						
(D) (a)-(1)-(ii), (b)-(2)-(i)						
(E) Answer not known						

140. Arranging chronological question :

Arrange the following events in chronological order to Iron ore formation in Tamilnadu

1. Formation of the Kanjamalai Granulite terrain
2. Formation of the super continent Rodinia
3. Intrusion of matic – ultramatic bodies
4. Weathering and formation of ore bodies

- | | |
|----------------------|----------------|
| (A) 2, 4, 1, 3 | (B) 1, 2, 3, 4 |
| (C) 4, 3, 1, 2 | (D) 3, 1, 4, 2 |
| (E) Answer not known | |

141. What is the Primary mineral composition of the magnesite deposits in chalk hills?
- (A) Calcium Carbonate (CaCO_3)
 - (B) Magnesium Carbonate (MgCO_3)
 - (C) Iron Oxide (Fe_2O_3)
 - (D) Silica (SiO_2)
 - (E) Answer not known
142. Which geological formation does the lignite in Jayamkondam belong to?
- (A) Gondwana formation
 - (B) Cuddalore Sandstone formation
 - (C) Vindhyan formation
 - (D) Siwalik formation
 - (E) Answer not known
143. The Cuddalore Sandstone overlies which older formation in parts of Tamilnadu?
- (A) Sittampundi Gneiss
 - (B) Charnockite Group
 - (C) Ariyalur group
 - (D) Vindhyan group
 - (E) Answer not known
144. Which district in Tamilnadu is known for its significant deposits of Magnesite?
- (A) Madurai
 - (B) Coimbatore
 - (C) Salem
 - (D) Tirunelveli
 - (E) Answer not known

145. Assertion [A] : The Ariyalur group is a major source of limestone in Tamilnadu.

Reason [R] : The Ariyalur group consists largely of non-carbonate rock deposited in a shallow marine environment.

- (A) Both [A] and [R] are true and [R] is the correct explanation of [A]
- (B) Both [A] and [R] are true, but [R] is not the correct explanation of [A]
- (C) [A] is true, but [R] is false
- (D) [A] is false, but [R] is true
- (E) Answer not known

146. The Cuddalore formation separated from the underlying Neyveli formation by an unconformity is of

- (A) Palaeocene – Middle Eocene age
- (B) Mio – Pliocene age
- (C) Upper Palaeocene – Middle Eocene age
- (D) Eocene age
- (E) Answer not known

147. Sattanur wood fossil is found at _____ of Cretaceous formation.

- | | |
|----------------------|------------------------|
| (A) Uttatur stage | (B) Trichinopoly stage |
| (C) Ariyalur stage | (D) Niniyur stage |
| (E) Answer not known | |

148. The fossil flora of Gondwana plant beds in the Sriperumbudur – Satyavedu is dominated by
- (A) Angiosperms
 - (B) Calcareous algae
 - (C) Ptilophyllum flora
 - (D) Glossopteris flora
 - (E) Answer not known
149. The Mamandur area in Kalla Kurichi district exposures dominantly of charnockite in the Western portion and in Eastern portion is occupied by
- (A) Pink Coloured granite
 - (B) Migmatitic gneisses
 - (C) Pink quartzo feldspathic granulite
 - (D) Quaternary sediments
 - (E) Answer not known
150. What is the inferred depositional environment of the Sivaganga formations?
- (A) Fluvial to lacustrine marsh conditions transitioning to tidal estuary
 - (B) Deep marine
 - (C) Glacial
 - (D) Desert
 - (E) Answer not known
151. Which type of carbonatite can be found in Sevathur?
- (A) Ankerite
 - (B) Beforsite
 - (C) Benstonite
 - (D) Sovite
 - (E) Answer not known

152. Which districts in Tamilnadu are known for significant charnockite exposures?
- (A) Madurai, Coimbatore and Salem
 - (B) Chennai, Nilgiris and Kanyakumari
 - (C) Tanjavur, Tiruchirappalli and Erode
 - (D) Vellore, Tiruvannamalai and Dindigul
 - (E) Answer not known
153. The Khondalite group mainly consists at
- (A) Limestone and dolomite
 - (B) Quartzite, garnet-sillimanite gneiss, graphite schist
 - (C) Basalt and gabbro
 - (D) Granite and Pegmatite
 - (E) Answer not known
154. Charnockitization is a process associated with
- (A) Retrograde metamorphism
 - (B) Contact metamorphism
 - (C) CO₂ – rich fluid infiltration during high-grade metamorphism
 - (D) Weathering of granite
 - (E) Answer not known
155. A large ultramafic complex devoid of carbonatite is located in the terrain in CHC; hosts the largest deposits of _____ in Tamilnadu.
- (A) Syenite
 - (B) Garnetiferous charnockite
 - (C) Magnesite
 - (D) Pink granite
 - (E) Answer not known

156. How many metamorphic facies were proposed by P.Eskola in 1915?
- (A) 10 facies (B) 8 facies
(C) 15 facies (D) 4 facies
(E) Answer not known
157. Which of the following is an example of a non-foliated metamorphic rock?
- (i) Quartzite
(ii) Marble
(iii) Phyllite
(iv) Schist
- (A) (i) and (iii) only (B) (ii), (iii) and (iv) only
(C) (i) only (D) (i) and (ii) only
(E) Answer not known
158. In Maculose structure, which of the following minerals are well developed?
- (i) Andalusite
(ii) Cordierite
(iii) Olivine
(iv) Ottrelite
- (A) (i), (ii) and (iii) only (B) (iv) only
(C) (i) and (ii) only (D) (i), (ii) and (iv) only
(E) Answer not known

159. Which among the following metamorphic structure preserve the traces of earlier geological features?
- (A) Palimpsest (B) Idioblastic
(C) Xenoblastic (D) Granoblastic
(E) Answer not known
160. _____ is a process of alkali metasomatism where alkali rich fluid from igneous source alter the country rocks.
- (A) Fenitization (B) Chloritization
(C) Kaolinization (D) Epidotization
(E) Answer not known
161. A _____ structure in metamorphic rocks refers to a mottled appearance caused by the presence of large distinct crystals called porphyroblasts.
- (A) Cataclastic structure (B) Schistose structure
(C) Maculose structure (D) Gneissose structure
(E) Answer not known

162. Match the following carbonate minerals with their chemical composition.

- | | |
|--------------|--|
| (a) Calcite | 1. $\text{Ca}(\text{MgFe})(\text{CO}_3)_2$ |
| (b) Dolomite | 2. FeCO_3 |
| (c) Siderite | 3. CaCO_3 |
| (d) Ankerite | 4. $\text{CaMg}(\text{CO}_3)_2$ |

- | | (a) | (b) | (c) | (d) |
|-----|------------------|-----|-----|-----|
| (A) | 1 | 3 | 4 | 2 |
| (B) | 1 | 2 | 3 | 4 |
| (C) | 4 | 3 | 2 | 1 |
| (D) | 3 | 4 | 2 | 1 |
| (E) | Answer not known | | | |

163. Which of the following rock types formed when silica is precipitated from water?

- (1) Dolomite
 - (2) Jasper
 - (3) Quartz
 - (4) Agate
- (A) 1, 2 and 4 only
 - (B) 1 and 4 only
 - (C) 1, 3 and 4 only
 - (D) 2 and 4 only
 - (E) Answer not known

164. Match the following material type with grain size

- | | | | |
|----|--------|---|-----------------------|
| 1. | Gravel | – | $< 1/256$ mm |
| 2. | Sand | – | $1/16$ and $1/256$ mm |
| 3. | Silt | – | > 2.00 m |
| 4. | Clay | – | 2 mm and $1/16$ mm |

- (A) 1, 3, 4, 2
(B) 3, 4, 2, 1
(C) 4, 3, 1, 2
(D) 1, 2, 3, 4
(E) Answer not known

165. A solid material carried along a river bed due to the force of flowing water. Which rolls, steps and drags these material along is called

- (A) Surface creep
(B) Saltation load
(C) Traction load
(D) Dust load
(E) Answer not known

166. The feature form either at the sediment – air interface by a drying process is called

- (A) Shrinkage cracks
(B) Syneresis cracks
(C) Mud cracks
(D) Wrinkle marks
(E) Answer not known

167. Which of the following rocks are formed on the continental facies?

- (i) Breccia
- (ii) Silt stone
- (iii) Conglomerate
- (iv) Clay stone
- (A) (i) and (iv)
- (B) (ii) and (iv)
- (C) (i), (ii) and (iii)
- (D) (i) and (iii)
- (E) Answer not known

168. The marks are produced due to scouring action of current and those formed by the action of debris carried by the currents

- (A) Scour marks
- (B) Cherron marks
- (C) Bounce marks
- (D) Sole marks
- (E) Answer not known

169. Obstacles like shells, wood, fragments leave marks on soft sediments is called

- (A) Imbrications
- (B) Current crescent
- (C) Swash marks
- (D) Rill marks
- (E) Answer not known

170. Structures which includes tracks : trails, grazing patterns are called
- (A) Bio stratification structures
 - (B) Biogenic structure
 - (C) Biodeposition structure
 - (D) Bioturbation structures
 - (E) Answer not known
171. Volcanic equivalent of Gabbro is
- (A) Dacite
 - (B) Dolerite
 - (C) Diorite
 - (D) Basalt
 - (E) Answer not known
172. Which of the following minerals are low silication?
- (i) Leucite – Olivine – Augite
 - (ii) Napheline – Biotite – Orthoclase
 - (iii) Analcite – Nepheline – Leucite
 - (iv) Albite – Anouthoclase – Aginine
- (A) (i) and (iv)
 - (B) (i), (ii) and (iii)
 - (C) (iii) only
 - (D) (iv) only
 - (E) Answer not known

173. _____ is measured by the ratio existing between the crystallised and non-crystallized matter.
- (A) Granularity
 - (B) Crystallinity
 - (C) Texture
 - (D) Grain size
 - (E) Answer not known
174. Which of the following syenite variety contains approximately equal amount of plagioclase and alkali feldspar?
- (A) Monzonite
 - (B) Shonkinite
 - (C) Larvikite
 - (D) Nardmakite
 - (E) Answer not known
175. Which of the following minerals is not typical of ultramafic rocks?
- (A) Olivine
 - (B) Clinopyroxene
 - (C) Spinel
 - (D) Muscovite
 - (E) Answer not known

176. The rate of cooling of magma or lava is reflected by _____ of the rocks.
- (A) Mineralogy
 - (B) Texture
 - (C) Colour
 - (D) Density
 - (E) Answer not known
177. A black or dark colored essentially non vesicular volcanic glass, usually of rhyolitic composition is
- (A) Tuff
 - (B) Obsidian
 - (C) Spilite
 - (D) Breccia
 - (E) Answer not known
178. Which of the following concordant igneous form found in folded region?
- (A) Sill
 - (B) Phacolith
 - (C) Laccolith
 - (D) Lopolith
 - (E) Answer not known

179. What is the salic/femic ratio of class persalic in CIPW classification of igneous rocks?
- (A) 7.00 – 1.66
 - (B) < 0.14
 - (C) > 7.00
 - (D) 0.06 – 0.14
 - (E) Answer not known
180. Which of the following rocks show poikilitic texture more common?
- (A) Syenite and monzonite
 - (B) Gabbro
 - (C) Peridotite
 - (D) Granite and Granodiorite
 - (E) Answer not known
181. The soft animals grows and covers the earlier whorls or body whorl may completely conceal the earlier whorls as in the cowry, the shells said to be convolute is
- (A) Cypraea
 - (B) Vermetus
 - (C) Operculum
 - (D) Natica
 - (E) Answer not known

182. The middle part of decan traps comprising about 1200 m thick lava flows and ash beds is practically devoid of inter-trappean beds, this unit is exposed in
- (A) Central India and Malva region
 - (B) North Western part of Peninsula
 - (C) Madhya Pradesh and Eastern Area
 - (D) Assam and Arakan Mountain belts of Eastern India
 - (E) Answer not known
183. In tertiary system of Kutch. The impure nummulitic limestone. From upper and middle Eocene belonging to
- (A) Sind series
 - (B) Kirthar series
 - (C) Gaj series
 - (D) Laki series
 - (E) Answer not known
184. In Terebratulacea, two ribbons of calcite grow forward into the brachial cavity, looping downward and then backward, their ends united by a transverse band. This constitutes a narrow calcareous shelf on which brachia or arms rest and it is called as
- (A) Deltidium
 - (B) Spondylium
 - (C) Curalium
 - (D) Brachidium
 - (E) Answer not known

185. The sandstone and shales of the Panchet series of the Gondwana system belonging to the Triassic and the sandstone and shales of Jabalpur series belonging to the
- (A) Jurassic
 - (B) Triassic
 - (C) Lower Cretaceous
 - (D) Upper Cretaceous
 - (E) Answer not known
186. The top most bed of the upper Triassic in all the above area are
- (A) Megalodon limestone
 - (B) Modular limestone
 - (C) Coral limestone
 - (D) Kioto limestone
 - (E) Answer not known
187. The lowest member of the cuddapah system taken its Name from the papagani river a tributary of the
- (A) Cheyiar
 - (B) Krishna
 - (C) Godavari
 - (D) Pennar
 - (E) Answer not known

188. The coal of Jherria fields belonging to the geological age of
- (A) Renigang stage
 - (B) Barakar stage
 - (C) Ironstone – shale stage
 - (D) Talchir stage
 - (E) Answer not known
189. Which of the following rock types host diamond mineralisation in Upper Vindhyan?
- (A) Ganugarh Shale
 - (B) Suket Shale
 - (C) Sandstone and Sirbu Shale
 - (D) Conglomerate and Jhiri Shale
 - (E) Answer not known
190. Matching the following groups with the formations by cuddapah super group :
- | | |
|----------------------|---------------------------|
| (a) Kistna Group | 1. Gulcheru Quartzite |
| (b) Nallamalai Group | 2. Nagri Quartzite |
| (c) Cheyair Group | 3. Barzen Konda Quartzite |
| (d) Papaghai Group | 4. Srisalam Quartzite |
-
- | | (a) | (b) | (c) | (d) |
|-----|------------------|-----|-----|-----|
| (A) | 4 | 3 | 2 | 1 |
| (B) | 4 | 2 | 3 | 1 |
| (C) | 2 | 4 | 3 | 1 |
| (D) | 1 | 3 | 4 | 2 |
| (E) | Answer not known | | | |

191. Which of the following rock is associated with papaghani series?
- (A) Srisailam Quartzite
 - (B) Cumbum Shale
 - (C) Irlakonda Quartzite
 - (D) Gulcheru Quartzite
 - (E) Answer not known
192. The Kaladgi group named after Kaladgi town located in _____ state.
- (A) Rajasthan
 - (B) Kerala
 - (C) Tamil Nadu
 - (D) Maharastra
 - (E) Answer not known
193. Which one of the following rock is a large plutonic body in the Dharwar Craton of South India?
- (A) Closepet Granite
 - (B) Kodurite
 - (C) Gondite
 - (D) Quartzite
 - (E) Answer not known

194. Kondalite are light coloured, richly garnetiferous gneiss is and schists characterised by the abundance of minerals
- (A) Quartz, Schimaniter, Garnet, Graphite
 - (B) Quartz, Manganese, Garnet, Rhodonite
 - (C) Quartz, Orthoclase, Manganse-garnet, apatite
 - (D) Quartz, Hematite schist, Magnetite-Schist
 - (E) Answer not known
195. Choose the right matches among the himalayans
- 1. Salkhala series – Kashmir areas
 - 2. Jutogh series – Simla areas
 - 3. Daling series – Kirana and Sangla areas
 - 4. Chail series – Kumaon areas
- (A) 1 and 3 are correct
 - (B) 1 and 2 are correct
 - (C) 2 and 3 are correct
 - (D) 3 and 4 are correct
 - (E) Answer not known
196. The Dharwanar rocks of Nagpur, Chhindwara and Bhandara districts of Madhyapradesh have been named the
- (A) Sakoli series
 - (B) Chilpi series
 - (C) Sausar series
 - (D) Champaner series
 - (E) Answer not known

197. In 1904, Sir, T.H. Holland proposed a new classification of the Indian State in which the Cuddapah and Vindhyan systems were grouped together under the name of
- (A) Purana Group
 - (B) Dravidian Group
 - (C) Aryan Group
 - (D) Vindhyan Group
 - (E) Answer not known
198. The body of rock unified by being formed during a specific interval of geologic time, represents all rocks formed anywhere during a certain segment of earth history
- (A) Litho Stratigraphic
 - (B) Chronostratigraphic
 - (C) Biostratigraphic
 - (D) Geochronologic
 - (E) Answer not known

199. Which of the following is the best for explains about the core challenge in correlating litho stratigraphic units with chronostratigraphic units, as described in the concept of dual hierarchy?
- (A) Fossil preservation is uniform a cross environments
 - (B) All stratigraphic units represents equal spans of geological time
 - (C) Biostratigraphic units may be controlled by local ecological factors, disrupting time correlation
 - (D) Rock units are always older than fossil records within them
 - (E) Answer not known
200. Who was the first person to observe and make use of the fossil species in an orderly succession within the strata?
- (A) William Smith
 - (B) Gottlob Werner
 - (C) Arduino
 - (D) Lehmann
 - (E) Answer not known