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120 MINUTES

1. What is the mean density of the continental crust?
A) 2.5 g/cc B) 2.7 g/cc
C) 3.1 g/cc D) 3.3 g/cc
2. Which phase is inferred to be typically occurring in the D-layer just above the core-mantle boundary?
A) Diamond B) Stishovite
C) Perovskite D) Post-perovskite
3. What type of feature is the 'Allah Bund' of Gujarat?
A) Fault scarp B) Fault-line scarp
C) Triangular facet D) Alluvial fan
4. Which of the following is the correct arrangement in the increasing geologic age?
A) Burdigalian – Danian – Turonian – Cenomanian - Albian
B) Turonian – Cenomanian - Albian - Burdigalian - Danian
C) Danian - Burdigalian - Turonian - Cenomanian - Albian
D) Albian - Burdigalian - Danian – Turonian - Cenomanian
5. What is the age of the Gorur gneiss?
A) 2.8 – 3.0 Ga B) 3.0 – 3.2 Ga
C) 3.2 – 3.3 Ga D) 3.4 – 3.5 Ga
6. Which is the predominant rock unit in the Sargur Schist Belt?
A) Amphibolites B) Ultramafic rocks
C) Metapelites D) Banded Iron formations
7. Which sediments are exposed along the Pranhita-Godavari Basin?
A) Paleozoic and Mesozoic B) Mesozoic and Cenozoic
C) Proterozoic to Cenozoic D) Gondwana and Mesozoic
8. What is the age of the sediments in the Sabari Basin?
A) Paleozoic B) Proterozoic
C) Gondwana D) Mesozoic
9. Which is the correct arrangement of the quartzites of the Cuddapah Supergroup in the order of decreasing age ?
A) Pulivendla – Gulcheru – Nagari – Bairenkonda - Srisailam
B) Nagari - Bairenkonda - Gulcheru - Pulivendla - Srisailam
C) Gulcheru – Pulivendla – Bairenkonda – Nagari - Srisailam
D) Gulcheru – Pulivendla – Nagari – Bairenkonda - Srisailam

10. Match the following earthquakes with their magnitudes:

<i>Earthquake</i>	<i>Magnitude</i>
1. Koyna (1967)	a. 5.7
2. Idukki (1989)	b. 5.8
3. Jabalpur (1987)	c. 6.2
4. Latur (1993)	d. 6.3
5. Nepal (2016)	e. 7.8

- A) 1-a; 2-b; 3-c; 4-d; 5-e B) 1-e; 2-d ; 3-c; 4-b; 5-a
 C) 1-c; 2-b; 3-a; 4-d; 5-e D) 1-c; 2-a; 3-b; 4-d; 5-e

11. Which of the following is the correct arrangement of formations of the Gondwana succession in the order of increasing geological age?

- A) Panchet - Karharbari - Raniganj - Barren Measures - Barakar
 B) Barren Measures - Barakar - Karharbari - Panchet - Raniganj
 C) Panchet - Raniganj - Barren Measures - Barakar - Karharbari
 D) Raniganj - Barren Measures - Barakar - Panchet - Karharbari

12. Which of the following is the correct arrangement of fossils in the order of increasing body size?

- A) Globigerina - Nautilus - Physa - Trachodon - Stegodon
 B) Physa - Globigerina - Nautilus - Trachodon - Stegodon
 C) Globigerina - Physa - Nautilus - Trachodon - Stegodon
 D) Globigerina - Physa - Nautilus - Stegodon - Trachodon

13. Which of the Mesozoic animals continue to exist in the modern seas?

- A) Nautilus B) Goniatites
 C) Ammonites D) Ceratites

14. Which of the following is the correct arrangement of formations of the Vindhyan Supergroup in the order of decreasing age?

- A) Suket Shale - Sasram Sandstone - Panna Shale - Sirbu Shale
 B) Sasram Sandstone - Suket Shale - Panna Shale - Sirbu Shale
 C) Suket Shale - Panna Shale - Sasram Sandstone - Sirbu Shale
 D) Suket Shale - Panna Shale - Sirbu Shale - Sasram Sandstone

15. Which is the correct order of dinosaur genera arranged according to their decreasing Geological age?

- A) Thecodonts - Quadropeds - Sauropods - Saurischians
 B) Thecodonts - Saurischians - Sauropods - Quadropeds
 C) Quadropeds - Saurischians - Thecodonts - Sauropods
 D) Thecodonts - Sauropods - Quadropeds - Saurischians

16. With which of the following, the terms 'red boles' and 'green boles' are associated?
 A) Vindhya B) Gondwanas
 C) Deccan traps D) Lametas
17. Which of the following is the correct arrangement of formations of the Cretaceous succession of Trichy in the order of increasing age ?
 A) Kulakkanattam - Sillakudi - Ottakovil - Kallankurichi - Kallamedu - Niniyur
 B) Kulakkanattam - Sillakudi - Kallankurichi - Ottakovil - Kallamedu - Niniyur
 C) Kallankurichi - Kulakkanattam - Sillakudi - Ottakovil - Kallamedu - Niniyur
 D) Sillakudi - Kulakkanattam - Kallankurichi - Ottakovil - Kallamedu - Niniyur
18. Which is the correct sequence of seismic discontinuities as per the increasing depth from the Earth's surface?
 A) Mohorovicic - Conrad - Lehman - Gutenberg
 B) Conrad - Mohorovicic - Gutenberg - Lehman
 C) Conrad - Lehman - Mohorovicic - Gutenberg
 D) Conrad - Mohorovicic - Lehman - Gutenberg
19. Which of the following is the correct arrangement of formations of the Deccan Traps in the order of increasing geological age ?
 A) Ratangad - Indrayani - Karla - Mahabaleshwar
 B) Karla - Ratangad - Indrayani - Mahabaleshwar
 C) Mahabaleshwar - Ratangad - Indrayani - Karla
 D) Ratangad - Karla - Indrayani - Mahabaleshwar
20. Match the igneous rocks in *Group I* with their corresponding type in *Group II*.
- | <i>Group I</i> | <i>Group II</i> |
|----------------|-----------------|
| P. Websterite | 1. Felsic |
| Q. Alaskite | 2. Mafic |
| R. Dolerite | 3. Intermediate |
| S. Diorite | 4. Ultramafic |
- A) P-4, Q-2, R-3, S-1 B) P-4, Q-1, R-2, S-3
 C) P-4, Q-2, R-1, S-3 D) P-3, Q-1, R-2, S-4
21. Which of the following is the correct order of primates in the decreasing geological age?
 A) Sivapithecus-Ramapithecus-Australopithecus-Gigantopithecus
 B) Sivapithecus-Ramapithecus-Gigantopithecus -Australopithecus
 C) Australopithecus-Gigantopithecus-Sivapithecus-Ramapithecus
 D) Sivapithecus-Gigantopithecus -Ramapithecus-Australopithecus

22. Match the fossils in *Group I* with their corresponding Phylum in *Group II*.
- | <i>Group I</i> | <i>Group II</i> |
|-----------------------|------------------------|
| P. Foraminifera | 1. Arthropoda |
| Q. Columnaria | 2. Mollusca |
| R. Turbo | 3. Anthozoa |
| S. Olenus | 4. Protozoa |
- A) P-4, Q-2, R-3, S-1 B) P-4, Q-3, R-2, S-1
C) P-4, Q-2, R-1, S-3 D) P-3, Q-1, R-2, S-4
23. Which of the following is the correct order of animals arranged as per their first appearance on the Earth?
- A) Paradoxides – Placoderm – Ammonite - Papio
B) Placoderm – Paradoxides – Ammonite - Papio
C) Paradoxides – Placoderm – Papio - Ammonite
D) Paradoxides – Papio - Ammonite - Placoderm
24. Which of the following criteria/theory states that the brittle strength of a rock is controlled by microfractures present in it?
- A) Mohr criteria B) Griffith's theory
C) Anderson theory D) Coulomb criteria
25. What data is used to arrive at fault-plane solution?
- A) Kinematic indicators
B) Slickensides
C) P and S wave data from seismic stations
D) GPS data
26. What is the nature of dip-isogons in similar folds?
- A) Converge towards inner arc B) Diverge towards inner arc
C) Parallel to the axial trace D) Normal to the axial trace
27. Which of the following rocks commonly show pencil cleavage?
- A) Mylonite B) Schist C) Sandstone D) Shale
28. Where do you find domino system faults?
- A) Extensional regime B) Transpressional regime
C) Compressional regime D) Ductile shear zones
29. Match the fossils in *Group I* with the corresponding Class in *Group II*.
- | <i>Group I</i> | <i>Group II</i> |
|-----------------------|------------------------|
| P. Phacops | 1. Crinoidea |
| Q. Turrilites | 2. Ammonoidea |
| R. Bellerophon | 3. Gasteropoda |
| S. Marsupites | 4. Crustacea |
- A) P-1, Q - 2, R - 3, S - 4 B) P - 4, Q - 2, R - 3, S - 1
C) P- 4, Q - 2, R-1, S - 3 D) P - 3, Q - 1, R - 2, S - 4

30. Match the pyroxenes in *Group I* with their range in Wollastonite contents in *Group II*.
- | <i>Group I</i> | <i>Group II</i> |
|---------------------|-----------------|
| P. Diopside | 1) 5-15 |
| Q. Augite | 2) 15-25 |
| R. Subcalcic Augite | 3) 25-45 |
| S. Pigeonite | 4) 45-50 |
- A) P-1, Q-2, R-3, S-4 B) P-4, Q-3, R-2, S-1
 C) P-4, Q-2, R-1, S-3 D) P-3, Q-1, R-2, S-4
31. Match the following sets of minerals with their corresponding chemical groups:
- | | |
|-------------|--------------|
| 1. Rutile | a. Oxide |
| 2. Sylvite | b. Halide |
| 3. Barite | c. Sulphate |
| 4. Siderate | d. Carbonate |
| 5. Monazite | e. Phosphate |
- A) 1-a; 2-b; 3-c; 4-d; 5-e B) 1- e; 2 - b; 3 - c; 4 - d; 5 - a
 C) 1-c; 2-a; 3-b; 4-d; 5-e D) 1- a; 2 -b; 3 - d; 4 - c; 5 - e
32. Which of the following is the correct order of minerals arranged as per increasing Mg content?
- A) Fayalite - Hortonolite – Hyalosiderite - Chrysolite
 B) Hortonolite – Fayalite - Hyalosiderite - Chrysolite
 C) Fayalite - Hyalosiderite - Hortonolite – Chrysolite
 D) Fayalite - Hortonolite – Chrysolite - Hyalosiderite
33. With which of the following rocks tin mineralization is associated?
- A) Ultramafic rocks and Komatiites
 B) Diorites and granodiorites
 C) Granites and pegmatites
 D) Metamorphosed pelites
34. What is the minimum depth of origin inferred for igneous rocks that contain diamond?
- A) 40 km B) 140 km C) 240 km D) 340 km
35. Which State in India has cassiterite deposits?
- A) Odisha B) West Bengal
 C) Chhattisgarh D) Jharkhand
36. What is the age in Ma of the magnetic polarity epoch 'Gauss'?
- A) 3.4 – 2.48 B) 4.4 – 3.48
 C) 5.4 – 4.48 D) 6.4 – 5.48
37. Which geomorphic concept is proposed to explain the origin of piedmont bench lands?
- A) Isostasy B) Davisian concept
 C) Knick point retreat D) Treppen concept

38. Match the following major geologic units of India with their petro-tectonic status:
- | | |
|------------------|--------------------------------------|
| 1. Eastern Ghats | a. Mobile Belt |
| 2. Deccan | b. Continental Flood basalt Province |
| 3. Godavari | c. Post-rift escarpment |
| 4. Western Ghats | d. Intracratonic rift graben |
| 5. Cuddapah | e. Proterozoic intracartonic basin |
- A) 1-a; 2-b; 3-c; 4-d; 5-e B) 1-e; 2-b; 3-c; 4-d; 5-a
 C) 1-c; 2-a; 3-b; 4-d; 5-e D) 1-a; 2-b; 3-d; 4-c; 5-e
39. Where does the mineral hypersthene plot on an ACF diagram ?
- A) Midway between C and F B) Midway between A and F
 C) Midway between A and C D) At F corner
40. What is the age (in billions of years) of the universe as per the Big Bang hypothesis?
- A) 13.8 B) 15.8 C) 18.8 D) 21.8
41. Which of the following is the most significant finding of the Chandrayan-1 on the lunar surface materials?
- A) carbon B) oxygen C) water D) sulphur
42. What is the mean temperature of the ocean surface water?
- A) 14 ° C B) 17° C C) 21 ° C D) 24 ° C
43. To which of the class of delta the Ganges- delta can be grouped?
- A) Wave dominated B) Fluvial dominated
 C) Tide dominated D) Lake dominated
44. Where is the '*Olympus Mons*' volcano located?
- A) Siberia B) Alaska C) Moon D) Mars
45. Which minerals constituents are found in the chondrules of meteorites?
- A) Ilmenite and titanite B) Magnetite and ilmenite
 C) Sulphide and oxide minerals D) Olivine and pyroxene
46. Match the standards used in isotope hydrology in *Group I* with their corresponding isotopes in *Group II*.
- | | |
|-------------------------------------|---------------------|
| Group I | Group II |
| P. Standard Mean Ocean Water (SMOW) | 1. S isotopes |
| Q. Pee Dee Belemnite (PDB) | 2. N isotopes |
| R. Atmospheric Air | 3. C and O isotopes |
| S. Canyon Diablo Meteorite | 4. O and H isotopes |
- A) P-4, Q-3, R-2, S-1 B) P-4, Q-2,R-3, S-1
 C) P-4, Q-2, R-1, S-3 D) P-3, Q-1, R-2, S-4

47. Arrange the following zones from the coast to offshore as per the *Law of the Sea* in accordance with their proximity to the land.
1. Exclusive Economic Zone
 2. Territorial waters
 3. Contiguous Zone
 4. Internal waters
 5. International waters
- A) 1-2-3-4-5 B) 2-3-1-4-5
C) 3-1-2-4-5 D) 4-2-3-1-5
48. Match the indicator plants in *Group I* with the corresponding metal in *Group II*.
- | <i>Group I</i> | <i>Group II</i> |
|---------------------------|-----------------|
| P. Vola calaminaria | 1. Gold |
| Q. Eriogonum ovalifolium | 2. Silver |
| R. Eschscholtzia mexicana | 3. Copper |
| S. Equisetum arvense | 4. Zinc |
- A) P-1, Q-2,R-3, S-4 B) P-4, Q-2, R-3, S-1
C) P-4, Q-2, R-1, S-3 D) P-3, Q-1, R-2, S-4
49. Which is the largest among the dwarf planets of the Solar System?
- A) Pluto B) Ceres C) Haumea D) Eris
50. What is the length of the coast line of Kerala?
- A) 380 km B) 480 km C) 580 km D) 680 km
51. What is the permitted pH range of drinking water as per the EPA standard?
- A) 5.5 – 7.5 B) 6.5 - 9.5 C) 6.5 – 8.5 D) 7.5 - 8.5
52. Which region of the EM-spectra the thermal infrared remote sensing normally measures?
- A) 8 -14 μm B) 6 -10 μm C) 10- 18 μm D) 12 - 24 μm
53. Arrange the following layers of the atmosphere according to the distance from the Earth's surface.
- EX - Exosphere
MS - Mesosphere
ST - Stratosphere
TH - Thermosphere
TR - Troposphere
- A) TR-TH-TS-MS-EX B) TR-ST-MS-TH-EX
C) TR-MS-ST-EX-TH D) TH-TR-ST-MS-EX

54. Match the fossils in *Group I* with their occurrence in the formations of Cretaceous of Trichy in *Group II*.

Group I	Group II
P. Nautilus	1. Uttatur
Q. Exogyra	2. Trichinopoly
R. Physa	3. Ariyalur
S. Pecten	4. Niniyur

- | | |
|-----------------------|-----------------------|
| A) P-1, Q-2, R-3, S-4 | B) P-4, Q-3, R-2, S-1 |
| C) P-4, Q-2, R-1, S-3 | D) P-3, Q-1, R-2, S-4 |

55. What is the method being executed for the disposal of high-level nuclear waste ?

- | | |
|----------------------------------|------------------|
| A) In deep geological repository | B) In deep ocean |
| C) In outer space | D) By recycling |

56. In which cratons the Phulad Lineament occurs?

- | | |
|----------------|-------------|
| A) Singhbhum | B) Bastar |
| C) Bundelkhand | D) Aravalli |

57. Match the following Siwalik fossils with their corresponding mammal groups:

1. Aceratherium	a. Suidae
2. Vishnutherium	b. Giraffidae
3. Chormohipparion	c. Rhinocerotidae
4. Hippohyus	d. Equidae
5. Nesokia	e. Rodentia

- | | |
|----------------------------|----------------------------|
| A) 1-a; 2-b; 3-c; 4-d; 5-e | B) 1-c; 2-a; 3-d; 4-b; 5-e |
| C) 1-c; 2-b; 3-d; 4-a; 5-e | D) 1-d; 2-e; 3-c; 4-b; 5-a |

58. Which of the following schist belts is the largest?

- | | |
|--------------|-----------------|
| A) Shimoga | B) Holenarsipur |
| C) Bababudan | D) Nuggihalli |

59. Match the Indian stratigraphic units in *Group I* with their status in *Group II*.

Group I	Group II
P. Lameta	1. Supergroup
Q. Kalsubai	2. Group
R. Uttatur	3. Subgroup
S. Gondwana	4. Formation

- | | |
|-----------------------|-----------------------|
| A) P-1, Q-2, R-3, S-4 | B) P-4, Q-3, R-2, S-1 |
| C) P-4, Q-2, R-3, S-1 | D) P-3, Q-4, R-2, S-1 |

60. Which is the correct order of volcanic rocks arranged in terms of increasing silica content ?

- | |
|---|
| A) Picrobasalt – Trachybasalt - Basaltic andesite - Dacite - Rhyolite |
| B) Trachybasalt - Picrobasalt – Basaltic andesite - Dacite - Rhyolite |
| C) Basaltic andesite - Trachybasalt - Picrobasalt – Dacite - Rhyolite |
| D) Trachybasalt - Picrobasalt – Basaltic andesite - Rhyolite - Dacite |

61. Which of the following intergrowths is called *graphic texture*?
- A) Quartz in plagioclase
 B) Quartz in alkali feldspar
 C) Alkali feldspar in plagioclase
 D) Plagioclase in alkali feldspar
62. Who coined the name 'laterite' for the weathered material of Kerala?
- A) C.S. Fox B) L.L. Fermor C) T.S.Holland D) F.H. Buchanan
63. Match the Supergroups of Indian Precambrians on the left with the corresponding Groups on the right.
- | <i>Supergroup</i> | <i>Group</i> |
|--------------------------|---------------------|
| P. Dharwar | 1. Kaimur |
| Q. Chattisgarh | 2. Chitravadi |
| R. Cuddapah | 3. Raipur |
| S. Vindhyan | 4. Bababudan |
- A) P-4, Q-2, R-3, S-1 B) P-3, Q-4, R-1, S-2
 C) P-3, Q-2, R-1, S-4 D) P-4, Q-3, R-2, S-1
64. Which of the following is the characteristic feature of HFSE?
- A) High charge/radius ratio B) Low charge/radius ratio
 C) High ionic radius D) Low ionic charge
65. Which is the correct order of rocks in the order of increasing alkali content?
- A) Trachybasalt – Basalt – Phonotephrite - Phonolite
 B) Basalt – Trachybasalt - Phonotephrite - Phonolite
 C) Trachybasalt - Basalt – Phonolite - Phonotephrite
 D) Basalt - Trachybasalt – Phonolite - Phonotephrite
66. What would be the composition of the first formed crystal from a melt of An₅₀-Ab₅₀ composition?
- A) An₅₀-Ab₅₀ B) An₈₀-Ab₂₀
 C) An₃₀-Ab₇₀ D) An₆₀-Ab₄₀
67. Which of the following represents the *Petrogeny's Residua System* of Tuttle and Bowen?
- A) Albite – Anorthite - Orthoclase
 B) Albite – Anorthite - Quartz
 C) Albite – Orthoclase - Quartz
 D) Quartz – Alkali-feldspar - Plagioclase
68. Match the basaltic provinces in Group I with the corresponding age in Group II.
- | <i>Group I</i> | <i>Group II</i> |
|-----------------------------------|------------------------|
| 1. Deccan Traps | a. 16 Ma |
| 2. Karoo Province | b. 66 Ma |
| 3. Columbia River Plateau Basalts | c. 183 Ma |
| 4. Siberian Traps | d. 249 Ma |
- A) 1-a, 2-b, 3-c, 4-d B) 1-b, 2-c, 3-a, 4-d
 C) 1-b, 2-a, 3-c, 4-d D) 1-b, 2-c, 3-d, 4-a

69. Match the Paleozoic fossils in Group *I* with the Formations in which they occur in Group *II*.
- | Group I | Group II |
|----------------|-----------------------|
| 1. Fenestella | a. Zewan Formation |
| 2. Deltopectin | b. Takche Formation |
| 3. Productus | c. Agglomeratic Slate |
| 4. Spirifer | d. Yamne Formation |
- A) 1-a, 2-b, 3-c, 4-d B) 1-b, 2-c, 3-a, 4-d
 C) 1-b, 2-a, 3-c, 4-d D) 1-b, 2-c, 3-d, 4-a
70. Match the following Siwalik Groups/Formations with their corresponding European equivalent:
- | <i>Siwalik Group/Formation</i> | <i>Standard European units</i> |
|--------------------------------|--------------------------------|
| 1. Pinjor | a. Tortonian |
| 2. Tatrot | b. Astian |
| 3. Nagri | c. Villafranchian |
| 4. Chinji | d. Sarmatian |
| 5. Muree | e. Burdigalian |
- A) 1-a; 2-b; 3-c; 4-d; 5-e B) 1-c; 2-a; 3-d; 4-b; 5-e
 C) 1-c; 2-b; 3-d; 4-a; 5-e D) 1-d; 2-e; 3-c; 4-b; 5-a
71. Which of the following corresponds to 'white schists'?
- A) Sillimanite schist B) Sericite bearing monomineralic rock
 C) Muscovite-quartzite D) Non-basaltic eclogites
72. Which of the following has the highest grain-size?
- A) Mylonite B) Ultramylonite
 C) Blastomylonite D) Protomylonite
73. Which one among the following minerals plot at a point different from others in the A'KF diagram?
- A) Biotite B) Anthophyllite
 C) Commingtonite D) Talc
74. What is the mean total organic content (TOC wt.%) in shale?
- A) 0.8 B) 1.8 C) 2.8 D) 3.8
75. What is the principal difference between shale and mudstone?
- A) Chemistry B) Mineralogy
 C) Structure D) Grain-size

76. Match the Indian magmatic expressions in *Group I* with their type in *Group II*.
- | Group I | | Group II | |
|-----------------------------|--|-----------------------|--|
| P. Deccan Traps | | 1. Ring complex | |
| Q. Sithampundi | | 2. Active volcanoes | |
| R. Narcondam-Barren Islands | | 3. Layered UM complex | |
| S. Girnar Hills | | 4. CFB province | |
- A) P-1, Q-2, R-3, S-4 B) P-3, Q-1, R-2, S-4
 C) P-4, Q-2, R-1, S-3 D) P-4, Q-3, R-2, S-1
77. What type of sediments are seen in Paludal environment?
 A) Coarse grained detritals
 B) Organic sediments rich in shell fragments
 C) Heavy minerals and placers
 D) Mixed mud and organic matter
78. Which land-mass was adjoining the Eastern Continental margin of India in the Gondwanaland ?
 A) Australia B) Madagascar
 C) Antarctica D) South Africa
79. Which mineral is commonly analyzed for EPMA based chemical dating?
 A) Monazite B) Zircon C) Apatite D) Garnet
80. In which district of Kerala the black cotton soil is seen in large amounts?
 A) Idukki B) Wayanad C) Alleppy D) Palakkad
81. Which of the following is a glacial lake formed by deepening of a cirque?
 A) Paternoster lake B) Kettle lake
 C) Tarn D) Fjord
82. Which of the coral reefs given below is typical to the Red Sea ?
 A) Atoll B) Barrier reef C) Table reef D) Habili
83. What is the elevation of the *Anamudi*, the highest peak of the Western Ghats?
 A) 2965 m B) 2695 m C) 2596 m D) 2569 m
84. What is the width of the Palghat Gap?
 A) 30 km B) 40 km C) 50 km D) 60 km
85. Which of the following is not a Platinum group element (PGE)?
 A) Iridium B) Osmium
 C) Rhodium D) Rhenium
86. At what pressure the graphite diamond transition would take place at a temperature of 2000 K?
 A) 5 GPa B) 8 GPa C) 10 GPa D) 12 GPa

87. Which isotopic ratio is relevant for the isotopic characterization of graphite ore deposits?
 A) $^{14}\text{C}/^{12}\text{C}$ B) $^{13}\text{C}/^{12}\text{C}$ C) $^{12}\text{C}/^{13}\text{C}$ D) $^{14}\text{C}/^{13}\text{C}$
88. Which is the correct arrangement of minerals as per increasing birefringence?
 A) Quartz – Apatite - Tourmaline – Zircon – Calcite
 B) Quartz – Tourmaline – Apatite – Zircon - Calcite
 C) Apatite – Quartz – Tourmaline - Calcite – Zircon
 D) Apatite – Quartz – Tourmaline – Zircon - Calcite
89. Match the following sets of minerals with their crystal system:
 1. Spessartine a. Isometric
 2. Apophyllite b. Tetragonal
 3. Spheue c. Orthorhombic
 4. Forsterite d. Monoclinic
 5. Wollastonite e. Triclinic
- A) 1-a; 2-b; 3-c; 4-d; 5-e B) 1-e; 2-b; 3-c; 4-d; 5-a
 C) 1-c; 2-a; 3-b; 4-d; 5-e D) 1-a; 2-b; 3-d; 4-c; 5-e
90. The silica and alkali contents of five plutonic rocks are given below. Assign appropriate names to them:

Sl. No.	SiO ₂ wt%	(Na ₂ O+K ₂ O) wt. %
1	60	4
2	55	10
3	50	3
4	75	7
5	42	2

- A) 1-Diorite; 2-Syenite; 3-Gabbro; 4-Granite; 5-Dunite
 B) 1-Syenite; 2-Diorite; 3-Gabbro; 4-Granite; 5- Dunite
 C) 1-Syenite; 2-Gabbro; 3-Diorite; 4- Dunite; 5-Granite
 D) 1-Gabbro; 2-Syenite; 3-Diorite; 4- Dunite; 5-Granite
91. Which is the principal clay mineral in altered mafic rocks?
 A) Kaolinite B) Illite
 C) Montmorillonite D) Smectite
92. By heating of which mineral to above 730⁰ C the mineral rutile can be produced?
 A) Ilmenite B) Pseudorutile
 C) Anatase D) Brookite
93. With which of the exploration technique the term ‘mGal’ is associated?
 A) Gravity B) Seismic
 C) Magnetic D) Resistivity
94. To which of the pyroxene series the mineral Johannsenite has solid solution relation?
 A) Enstatite-Ferroslite B) Diopside-Hedenbergite
 C) Augite-Ferroaugite D) Clinoenstatite-Clinohypersthene

95. Which is the correct arrangement of minerals according to increasing hardness?
A) Dolomite – Graphite _ Quartz -Corundum
B) Graphite – Dolomite – Corundum - Quartz
C) Graphite – Dolomite –Quartz - Corundum
D) Dolomite – Graphite – Corundum - Quartz
96. What is the name given to a stream flowing down the original slope of the land ?
A) Consequent B) Subsequent
C) Resequent D) Insequent
97. To what kind of pollution/hazard the historical gold mining sites are noted for ?
A) Arsenic poisoning of groundwater
B) Mercury poisoning
C) Gold in solution
D) Large scale groundwater depletion
98. Match the economic deposits in *Group I* with their Indian occurrences in *Group II*.
- | Group I | Group II |
|----------------|-----------------|
| P. Gold | 1. Tummalapalle |
| Q. Copper | 2. Khetri |
| R. Uranium | 3. Agucha |
| S. Lead | 4. Jonnagiri |
- A) P-4, Q-2, R-1, S-3 B) P-3, Q-2, R-4, S-1
C) P-4, Q-2, R-3, S-1 D) P-3, Q-1, R-2, S-4
99. Match the economic deposits in *Group I* with their place of occurrence in Kerala in *Group II*.
- | Group I | Group II |
|----------------|-----------------|
| P. Graphite | 1. Punalur |
| Q. Phlogopite | 2. Akkulam |
| R. Gold | 3. Kanjirapally |
| S. Clay | 4. Nilambur |
- A) P-4, Q-1,R-2, S-3 B) P-3, Q-4, R-1, S-2
C) P-3, Q-1, R-4, S-2 D) P-3, Q-2, R-1, S-4
100. Match the economic deposits in *Group I* with their industrial use in *Group II*.
- | Group I | Group II |
|----------------|----------------------|
| P. Gypsum | 1. Paper making |
| Q. Talc | 2. Making wall-board |
| R. Barite | 3. Fertilizer |
| S. Magnesite | 4. Drilling mud |
| T. Apatite | 5. Steel industry |
- A) P-4, Q-1, R-2, S-3, T-5 B) P-2, Q-1, R-4, S-5, T-3
C) P-3, Q-5, R-1, S-2, T-4 D) P-3, Q-1, R-4, S-2, T-5

101. The term *dinosaur coprolites* refers to which of the following?
A) Bones B) Eggs C) Foot-prints D) Excreta
102. Which aspect is studied in *allometry* of fossils?
A) Life span in varying climates
B) Relative growth of body parts with age
C) Branching in the evolutionary tree
D) Causes of mass extinction
103. Which geological field equipment has brands like *Clar, Suunto, Silva Ranger and Meridian*?
A) GPS B) GIS C) Compass D) Altimeter
104. Which of the following projections is commonly used for geological maps?
A) Cassini B) Gall-Peters
C) Hubo-Dyer D) Transverse Mercator
105. In which type of river system is vertical accretion dominant?
A) Dendritic drainage B) Trellis drainage
C) Meandering rivers D) Anastomosing rivers
106. Which of the following is a surface mining technique?
A) Highwall mining B) Room and pillar mining
C) Longwall mining D) Drift mining
107. Which of the following indicates the adding of geographical identification meta data to various media such as photographs?
A) Georeferencing B) Geotagging
C) Geocoding D) Rubbersheeting
108. Which of the following indicates a small headwater valley that is sediment-choked and swampy?
A) Swell B) Dale C) Dell D) Cirque
109. Which of the following is almost synonymous with laterite ?
A) Bauxite B) Regolith C) Saprolite D) Kodurite
110. Match the pioneers in Indian geology in *Group I* with their significant contribution/ field of study in *Group II*.
- | | |
|----------------|--|
| Group I | Group II |
| P) L.L. Fermor | 1. Himalayan Geology |
| Q) R.D. Oldham | 2. Archeology and Prehistory |
| R) R.B. Foote | 3. Delineation of Charnockitic province in S India |
| S) J.B. Auden | 4. Recording of seismic waves |
-
- | | |
|-----------------------|-----------------------|
| A) P-4, Q-1, R-2, S-3 | B) P-3, Q-2, R-1, S-4 |
| C) P-3, Q-4, R-1, S-2 | D) P-3, Q-1, R-4, S-2 |

111. Match the minerals in *Group I* with their optical nature in *Group II*.

Group I	Group II
P. Spene	1. Biaxial negative
Q. Kyanite	2. Biaxial positive
R. Fluorite	3. Uniaxial positive
S. Beryl	4. Isotropic
T. Rutile	5. Uniaxial negative

- A) P-4, Q-1, R-2, S-3, T-5 B) P-3, Q-5, R-1, S-2, T-4
C) P-2, Q-1, R-4, S-5, T-3 D) P-3, Q-1, R-4, S-2, T-5

112. Match the carbonate minerals in *Group I* with their principal cation in *Group II*.

Group I	Group II
P. Siderite	1. Mn
Q. Rhodocrosite	2. Mg
R. Aragonite	3. Fe
S. Magnesite	4. Ca
T. Witherite	5. Ba

- A) P-4, Q-1, R-2, S-3, T-5 B) P-2, Q-1, R-4, S-5, T-3
C) P-3, Q-5, R-1, S-2, T-4 D) P-3, Q-1, R-4, S-2, T-5

113. Match the minerals in *Group I* with their family in *Group II*.

Group I	Group II
P. Hercynite	1. Olivine
Q. Monticellite	2. Spinel
R. Fuchsite	3. Pyroxene
S. Paragasite	4. Mica
T. Jadeite	5. Amphibole

- A) P-2, Q-1, R-4, S-5, T-3 B) P-4, Q-1, R-2, S-3, T-5
C) P-3, Q-5, R-1, S-2, T-4 D) P-3, Q-1, R-4, S-2, T-5

114. Match the minerals in *Group I* with their silicate class in *Group II*.

Group I	Group II
P. Vermiculite	1. Inosilicate
Q. Glaucophanite	2. Phyllosilicate
R. Cordierite	3. Sorosilicate
S. Tephroite	4. Cyclosilicate
T. Allanite	5. Nososilicate

- A) P-2, Q-1, R-4, S-5, T-3 B) P-4, Q-1, R-2, S-3, T-5
C) P-3, Q-5, R-1, S-2, T-4 D) P-3, Q-1, R-4, S-2, T-5

115. Which is the correct order of volcanic rocks arranged in terms of decreasing geological age?

- A) Sylhet Traps – Panjal Traps – Rajmahal Traps - Deccan Traps
B) Panjal Traps – Sylhet Traps – Rajmahal Traps - Deccan Traps
C) Panjal Traps – Rajmahal Traps - Sylhet Traps- Deccan Traps
D) Rajmahal Traps - Panjal Traps – Sylhet Traps- Deccan Traps

116. Match the metamorphic rocks in *Group I* with their precursors in *Group II*.
- | Group I | | Group II | |
|----------------|--|-----------------|--|
| P. Marble | | 1. Pelite | |
| Q. Khondalite | | 2. Coal | |
| R. Amphibolite | | 3. Limestone | |
| S. Graphite | | 4. Basalt | |
- A) P-4, Q-1, R-2, S-3 B) P-3, Q-4, R-1, S-2
 C) P-3, Q-2, R-1, S-4 D) P-3, Q-1, R-4, S-2
117. From which of the formations seagrass beds are reported?
 A) Warkalli formation B) Quilon Limestone
 C) Vaikom formation D) Vembanad formation
118. To which of the following categories the fossil *Pseudotaberina malabarica* belongs to ?
 A) Foraminifera B) Ostracod
 C) Bivalve D) Pteropod
119. From which valley, the fossils of early man were reported?
 A) Narmada B) Indus C) Cauvery D) Godavari
120. Which of the following statements is correct ?
 A) No olivine can co-exist with quartz in igneous rocks
 B) Olivine with Fayalite composition can occur with quartz in igneous rocks
 C) All magmatic rocks contain either quartz or olivine
 D) All rocks from primary magmas have olivine in them
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