

1. Which day is observed as 'Earth Day', as proclaimed by the UN, to focus on the environment?  
A) 21<sup>st</sup> March                                      B) 22<sup>nd</sup> March  
C) 21<sup>st</sup> April                                        D) 22<sup>nd</sup> April
2. By how much degrees the Earth's magnetic axis differs from its rotational axis?  
A) 7.5                                      B) 9.5                                      C) 11.5                                      D) 13.5
3. Which of the following attributes of the Solar System is postulated in Bode's Law?  
A) Distribution of angular momentum  
B) Spacing of planets  
C) Variation of densities of inner and outer planets  
D) All of the above
4. Which of the following is the correct statement as to the energy and mass distribution in the Solar System?  
A) The bulk of the mass is concentrated in the planets and the angular momentum is essentially centered in the Sun  
B) The bulk of the angular momentum is concentrated in the planets and the mass is essentially centered in the Sun  
C) Both the angular momentum and the mass are centered essentially in the Sun  
D) Both the angular momentum and the mass are centered essentially in the planets
5. How much is the mass of the planet Jupiter, taking Earth as one unit?  
A) 118                                      B) 218                                      C) 318                                      D) 418
6. Who was the first to divide the Tertiary sediments of Kerala into *Quilon beds* and *Warkalli beds*?  
A) Foot                                      B) King                                      C) Wadia                                      D) Krishnan
7. Which is the typical flora of the Kamthi formation?  
A) Gangamopteris                                      B) Glossopteris  
C) Ptilophyllum                                      D) Phyllothea
8. What is the age of most of the coals in the Gondwana Basin?  
A) Permian                                      B) Carboniferous                                      C) Devonian                                      D) Silurian
9. Which is the correct arrangement of the shales of the Cuddapah Super Group in the order of decreasing age ?  
A) Tadapatri – Vempalle – Cumbum – Kolumnala  
B) Vempalle – Cumbum – Tadapatri – Kolumnala  
C) Vempalle – Tadapatri – Cumbum – Kolumnala  
D) Vempalle – Tadapatri – Kolumnala – Cumbum

10. Match the following earthquakes with their magnitudes:

<i>Earthquake</i>	<i>Magnitude</i>
1. Tohoku (2011)	a) <b>8.4</b>
2. Sumatra (2004)	b) <b>8.6</b>
3. Peru (2001)	c) <b>9.1</b>
4. Alaska (1964)	d) <b>9.2</b>
5. Chile (1960)	e) <b>9.5</b>

- 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-d; 2-b; 3-a; 4-c; 5-e

11. Which of the following is the correct arrangement of formations of the Deccan Traps of Maharashtra in the order of increasing geological age?

- A) Ratangad – Salher- Indrayani - Mahabaleshwar  
 B) Mahabaleshwar - Ratangad – Indrayani - Salher  
 C) Ratangad – Indrayani - Mahabaleshwar - Salher  
 D) Salher – Ratangad – Indrayani – Mahabaleshwar

12. Which of the following is the correct arrangement of minerals in the order of increasing specific gravity?

- A) Garnet – Corundum – Olivine – Barite – Galena  
 B) Garnet – Barite – Corundum – Olivine – Galena  
 C) Garnet – Corundum – Olivine – Galena – Barite  
 D) Corundum – Garnet – Barite – Olivine – Galena

13. Who reported the occurrence of *Teberina malabarica* from Quilon Limestone for the first time?

- A) King (1882)                      B) Carter (1853)  
 C) Chatterjee and Pant (1971)    D) Rasheed and Ramachandran (1978)

14. Which of the following is the correct arrangement of minerals in the order of increasing refractive index?

- A) Calcite – Quartz – Topaz – Pyrope – Diamond  
 B) Quartz – Calcite – Topaz – Pyrope – Diamond  
 C) Calcite – Quartz – Topaz – Diamond – Pyrope  
 D) Quartz – Calcite – Pyrope – Topaz – Diamond

15. Which is the correct order of rocks in terms of their increasing Mg number?

- A) Andesite – Rhyolite – Basalt - Komatiite  
 B) Rhyolite – Andesite - Komatiite – Basalt  
 C) Rhyolite – Basalt - Andesite – Komatiite  
 D) Rhyolite – Andesite – Basalt – Komatiite

16. To which group the *Maravathur Clay* belongs to ?  
 A) Uttattur                                      B) Trichinopoly  
 C) Ariyalur                                        D) Niniyur
17. Which of the following is the correct arrangement of beds of the Mesozoics of Kachchh in the order of increasing age ?  
 A) Macrocephalus beds – Pacham coral bed – Rehmani beds – Anceps beds – Trigonia beds – Bhuj beds  
 B) Pacham coral bed – Macrocephalus beds – Anceps beds – Rehmani beds – Trigonia beds – Bhuj beds  
 C) Pacham coral bed – Macrocephalus beds – Rehmani beds – Anceps beds – – Bhuj beds - Trigonia beds  
 D) Pacham coral bed – Macrocephalus beds – Rehmani beds – Anceps beds – Trigonia beds – Bhuj beds
18. Which is the correct sequence of formations of the Krishna-Godavari basin from top to bottom?  
 A) Raghavapuram - Tirupati - Kamthi - Kota  
 B) Kota - Tirupati - Raghavapuram - Kamthi  
 C) Tirupati - Raghavapuram - Kota - Kamthi  
 D) Raghavapuram - Tirupati - Kota - Kamthi
19. Which of the following is the correct arrangement of shale formations of the Vindhyan Super Group in the order of decreasing geological age?  
 A) Suket shale – Kheinjua shale – Bijaigarh shale – Jhiri shale – Sirbu shale  
 B) Kheinjua shale – Bijaigarh shale – Suket shale – Jhiri shale – Sirbu shale  
 C) Kheinjua shale – Suket shale – Bijaigarh shale – Jhiri shale – Sirbu shale  
 D) Kheinjua shale – Suket shale – Bijaigarh shale – Sirbu shale – Jhiri shale
20. Match the early workers on the Neogene sediments of Kerala coast in **Group I** with the corresponding year of publication of their main contributions in **Group II**.
- | <u>Group I</u>              | <u>Group II</u> |
|-----------------------------|-----------------|
| P) Raghava Rao              | 1. (1952)       |
| Q) Desikachar & Subramanyam | 2. (1959)       |
| R) Jacob & Sastri           | 3. (1968)       |
| S) Paulose & Narayanaswamy  | 4. (1976)       |
- A) P-4, Q-2, R-1, S-3                                      B) P-4, Q-1, R-2, S-3  
 C) P-4, Q-2, R-3, S-1                                      D) P-3, Q-1, R-2, S-4
21. Which of the following is the correct arrangement of animals in the order in which they first appeared on the Earth?  
 A) Tortoise – Fish – Dinosaur - Pig - Human  
 B) Fish – Tortoise – Pig - Dinosaur - Human  
 C) Fish – Tortoise – Dinosaur - Pig - Human  
 D) Fish – Tortoise – Dinosaur - Human - Pig

22. Match the fossils in **Group I** with their corresponding Phylum in **Group II**.
- | <u><b>Group I</b></u> |              | <u><b>Group II</b></u> |              |
|-----------------------|--------------|------------------------|--------------|
| P.                    | Globigerina  | 1.                     | Arthropoda   |
| Q.                    | Tetragraptus | 2.                     | Mollusca     |
| R.                    | Trochus      | 3.                     | Hemichordata |
| S.                    | Phillipsia   | 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) Calymene – Monograptus – Turbo - Sivatherium  
 B) Monograptus –Calymene –Turbo - Sivatherium  
 C) Calymene – Monograptus –Sivatherium - Turbo  
 D) Monograptus - Calymene -- Sivatherium – Turbo
24. What is the chief rock type of Malwar Plateau?
- A) Quartzite      B) Gneiss      C) Granite      D) Basalt
25. Which of the following trace element ratios remain almost constant throughout any fractional crystallization process?
- A) K/Rb      B) Ba/Sr      C) Sm/Nd      D) Zr/Hf
26. Which of the following elements is NOT enriched more than 100 times the average crust in coal ash?
- A) As      B) Sc      C) U      D) Ge
27. When did the Lonar crater form?
- A) Triassic      B) Jurassic  
 C) Cretaceous      D) Quaternary
28. Which mineral is the principal carrier of REE in most of the igneous rocks?
- A) Quartz      B) Plagioclase      C) Apatite      D) Biotite
29. Match the fossils in **Group I** with the corresponding Class in **Group II**.
- | <u><b>Group I</b></u> |            | <u><b>Group II</b></u> |             |
|-----------------------|------------|------------------------|-------------|
| P.                    | Agnostus   | 1.                     | Echinoidea  |
| Q.                    | Goniatites | 2.                     | Ammonoidea  |
| R.                    | Trochus    | 3.                     | Gasteropoda |
| S.                    | Cidaris    | 4.                     | Crustacea   |
- A) P-1, Q-2, R-3, S-4      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

30. Match the plutonic rocks in **Group I** with their range in Q content in the recalculated QAP values for classification in **Group II**.
- |    | <u><b>Group I</b></u> | <u><b>Group II</b></u> |
|----|-----------------------|------------------------|
| P. | Quartzolite           | 1) 0 - 5               |
| Q. | Tonalite              | 2) 5 - 20              |
| R. | Quartz syenite        | 3) 20 - 60             |
| S. | Gabbro                | 4) 90 - 100            |
- 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. Brookite  | a. Oxide     |
| 2. Fluorite  | b. Halide    |
| 3. Anhydrite | c. Sulphate  |
| 4. Siderite  | d. Carbonate |
| 5. Apatite   | e. Phosphate |
- A) 1-a; 2-b; 3-c; 4-d; 5-e      B) 1-e; 2-b; 3-c; 4-a; 5-d  
 C) 1-c; 2-a; 3-b; 4-e; 5-d      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 Ca content?
- A) Bronzite - Pigeonite – Augite – Diopside - Wollastonite  
 B) Pigeonite –Bronzite - Augite – Diopside - Wollastonite  
 C) Bronzite - Pigeonite – Augite – Wollastonite - Diopside  
 D) Pigeonite – Augite – Bronzite - Diopside - Wollastonite
33. Which of the following rocks shows a highly fractionated chondrite-normalized REE pattern?
- A) Anorthosite      B) Granite  
 C) Continental tholeiitic basalt      D) Mid ocean ridge basalt
34. Which is the parent material for petroleum just as peat is for coal?
- A) Bitumen      B) Naphtha      C) Shale      D) Sapropel
35. Which country has the highest reserve of petroleum deposit in the world?
- A) Iran      B) Kuwait      C) Saudi Arabia      D) Iraq
36. What is the age of fossils in the Cretaceous rocks of Trichinopoly ?
- A) Upper Cenomanian to Maestrichian  
 B) Lower Turonian to Senonian  
 C) Upper Albian to Danian  
 D) Lower Senonian to Danian
37. Which of the following is equivalent to the Dharwars?
- A) Wynad group      B) Manantoddy group  
 C) Nilambur group      D) Vengad group

38. Match the following major geologic units/features of India with their petro-tectonic status:
- |                  |                                    |
|------------------|------------------------------------|
| 1. Eastern Ghats | a. Mobile Belt                     |
| 2. Closepet      | b. Batholith                       |
| 3. Western Ghats | c. Post-rift escarpment            |
| 4. Mahanadi      | d. Intracratonic rift graben       |
| 5. Vindhyaans    | e. Proterozoic intracratonic basin |
- A) 1-a; 2-b; 3-c; 4-d; 5-e    B) 1-e; 2-b; 3-c; 4-a; 5-d  
C) 1-c; 2-a; 3-b; 4-d; 5-e    D) 1-a; 2-b; 3-d; 4-c; 5-e
39. Which part of the Cretaceous basin of Trichinopoly exposes the oldest beds?  
A) Northern                            B) Southern  
C) Eastern                                D) Western
40. Which major element is substituted by Ga in minerals and rocks?  
A) Si                                      B) Al                                      C) Fe                                      D) Mg
41. What causes the increasing concentration of Helium in the atmosphere?  
A) solar input                            B) melting of glaciers  
C) evaporation                            D) radioactive decay of U and Th
42. What is the age of Pan-African tectonothermal event?  
A) 350 Ma                            B) 450 Ma                            C) 550 Ma                            D) 750 Ma
43. In what respect Trondhjemite differs from Tonalite?  
A) low silica content                    B) low quartz content  
C) low feldspar content                D) low mafic content
44. Which is the source rock for the Upper Assam petroliferous deposit?  
A) Tipam formation                    B) Sylhet traps  
C) Bengal formation                    D) Barail formation
45. Which rocks are predominantly seen on the lunar surface?  
A) Basalts and granites                B) Gabbro and basalts  
C) Basalts and anorthosites           D) Rhyolites and basalts
46. Match the rocks in **Group I** with their principal minerals in **Group II**.
- |    |                |    |                 |
|----|----------------|----|-----------------|
|    | <i>Group I</i> |    | <i>Group II</i> |
| P. | Dunite         | 1. | Quartz          |
| Q. | Anorthosites   | 2. | Feldspar        |
| R. | Silicites      | 3. | Olivine         |
| S. | Carbonatites   | 4. | Mica/Chlotite   |
| T. | Phyllite       | 5. | Calcite         |
- A) P-4, Q-3, R-2, S-1, T-5    B) P-3, Q-2, R-5, S-4, T-1  
C) P-3, Q-2, R-4, S-1, T-5    D) P-3, Q-2, R-1, S-5, T-4

47. Arrange the following metamorphic recrystallization reactions as per the increasing temperatures at which they take place.
1. Dolomite = Periclase + Calcite
  2. Calcite + Quartz = Wollastonite
  3. Dolomite + Quartz = Talc + Calcite
  4. Magnesite + Quartz = Talc
- A) 1-2-3-4      B) 2-3-1-4      C) 3-1-2-4      D) 4-2-3-1
48. Match the intrusives in **Group I** with the corresponding associated mineralization in **Group II**.
- | <u>Group I</u>          | <u>Group II</u> |
|-------------------------|-----------------|
| P. Punalur dunite       | 1. Phlogopite   |
| Q. Attappady peridotite | 2. Magnesite    |
| R. Ambalavayal granite  | 3. Molybdenite  |
| S. Kalpatta granite     | 4. Fluorite     |
| T. Puttetti syenite     | 5. Zircon       |
- A) P-1, Q-2, R-3, S-4, T-5      B) P-4, Q-2, R-3, S-1, T-5  
 C) P-4, Q-2, R-1, S-3, T-5      D) P-3, Q-1, R-2, S-5, T-4
49. What is the maximum thickness of Neogene sequence of the Konkan Kerala Basin as revealed by offshore drilling off Kochi?
- A) 2 km      B) 4 km      C) 6 km      D) 8 km
50. What is the extent of the *coastal regulation zone* from the high tide line (HTL) as per the Coastal Regulation Act (1991)?
- A) 200m from HTL      B) 500m from HTL  
 C) 1km from HTL      D) 2 km from HTL
51. Which mineral in laterite can be dated by K-Ar and Ar-Ar methods to get the age of lateritisation?
- A) goethite      B) limonite  
 C) glauconite      D) cryptomelane
52. What is the age of schistose rocks of Karnataka?
- A) 4.0 -3.0 Ga      B) 3.5 – 2.5 Ga      C) 3.0 – 2.0 Ga      D) 2.5 – 1.5 Ga
53. Arrange the following silicate classes according to the increasing Si/O ratio.
- CY - Cyclosilicates  
 DB - Double chain Silicates  
 PH - Phyllosilicates  
 TK - Tectosilicates  
 SR - Sorosilicates
- A) SR - CY - PH - DB - TK      B) SR – DB – CY – PH - TK  
 C) SR – CY - DB - PH - TK      D) TK - PH - DB - CY - SR

54. Match the minerals in **Group I** with their corresponding class in **Group II**.
- |    | <u><b>Group I</b></u> |    | <u><b>Group II</b></u> |
|----|-----------------------|----|------------------------|
| P. | Diopside              | 1. | Orthopyroxene          |
| Q. | Salite                | 2. | Clinopyroxene          |
| R. | Gedrite               | 3. | Orthoamphibole         |
| S. | Glaucophanes          | 4. | Clinoamphibole         |
- A) P-1, Q-2, R-3, S-4      B) P-2, Q-1, R-3, S-4  
 C) P-1, Q-2, R-4, S-3      D) P-2, Q-3, R-1, S-4
55. What is the feldspathoid-bearing equivalent of *Trachyte*?  
 A) Latite      B) Tephrite      C) Phonolite      D) Ijolite
56. Which of the following terms refers to granites *sensu lato*?  
 A) Granitoid      B) Granitic      C) Granofelsic      D) Felsic
57. Match the following Siwalik fossils with their corresponding mammal groups:
- |                   |                   |
|-------------------|-------------------|
| 1. Listriodon     | a. Suidae         |
| 2. Sivatherium    | b. Giraffidae     |
| 3. Gaiandatherium | c. Rhinocerotidae |
| 4. Hipparion      | d. Equidae        |
| 5. Hystrix        | 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 is the source of commercial Helium?  
 A) Synthesis in atomic reactors      B) Extraction from natural gas  
 C) Breaking up of hydrogen      D) From marine organisms
59. Match the Indian stratigraphic units in **Group I** with their status in **Group II**.
- |    | <u><b>Group I</b></u> |    | <u><b>Group II</b></u> |
|----|-----------------------|----|------------------------|
| P. | Bagh                  | 1. | Supergroup             |
| Q. | Lonavala              | 2. | Group                  |
| R. | Karewa                | 3. | Subgroup               |
| S. | Dharwar               | 4. | Formation              |
- A) P-1, Q-2, R-3, S-4      B) P-4, Q-2, R-3, S-1  
 C) P-4, Q-3, R-2, S-1      D) P-3, Q-4, R-2, S-1
60. Which is the correct order of plutonic rocks arranged in terms of increasing silica content?  
 A) Carbonatite – Peridotite - Dolerite - Diorite - Syenite  
 B) Peridotite - Carbonatite –Dolerite - Diorite - Syenite  
 C) Carbonatite – Peridotite - Diorite - Dolerite - Syenite  
 D) Carbonatite – Peridotite – Dolerite - Syenite - Diorite



61. Where do you expect natural mullite occurrence?  
 A) Retrogressed eclogite      B) Pelitic xenoliths in mafic rocks  
 C) Metamorphosed bauxites      D) In meteorites
62. Match the igneous rocks in **Group I** with their class in **Group II**.
- | <u><b>Group I</b></u> | <u><b>Group II</b></u> |
|-----------------------|------------------------|
| P. Komatiite          | 1. Felsic              |
| Q. Gabbro             | 2. Intermediate        |
| R. Andesite           | 3. Mafic               |
| S. Granophyre         | 4. Ultramafic          |
- 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
63. Match the Formations of Indian stratigraphy on the left with the corresponding Groups on the right.
- | <u><b>Formation</b></u> | <u><b>Group</b></u> |
|-------------------------|---------------------|
| P. Penganga             | 1. Surma            |
| Q. Suket Shale          | 2. Karewa           |
| R. Hirpur               | 3. Semri            |
| S. Boka Bil             | 4. Kurnool          |
- 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. In having which of the following, the Archean granitoids differ from their younger counterparts?  
 A) Low silica and low K/Na ratio  
 B) High silica and low K/Na ratio  
 C) Low silica and high K/Na ratio  
 D) High silica and high K/Na ratio
65. Which is the correct order of rocks in the order of increasing mafic content?  
 A) Granite – Diorite- Lherzolite – Silexite - Dolerite  
 B) Silexite - Granite – Dolerite -Diorite –Lherzolite  
 C) Granite –Silexite - Diorite – Dolerite - Lherzolite  
 D) Silexite - Granite – Diorite – Dolerite - Lherzolite
66. To which rock a high Mg andesite will grade to?  
 A) Basaltic andesite      B) Boninite  
 C) Dacite      D) Syenite
67. Due to which of the following facts the Tholeiitic suite follows a distinct initial trend compared to the Calc-alkaline suite in the AFM diagram?  
 A) Low silica minerals are crystallized first  
 B) Fe replenishment along with differentiation  
 C) Little Fe is removed by way of crystallization  
 D) High Mg minerals are crystallized earlier

68. Match the sites of national geological monuments in Group *I* with the corresponding geology in Group *II*.

- | <u>Group I</u>             | <u>Group II</u>            |
|----------------------------|----------------------------|
| 1. Maradihalli             | a. Columnar lavas          |
| 2. Thiruvakkarai           | b. Pillow lavas            |
| 3. Angadipuram             | c. Fossil wood             |
| 4. Lalbagh                 | d. Laterite                |
| 5. St.Mary's islands       | e. Peninsular gneiss       |
| A) 1-a, 2-b, 3-c, 4-d, 5-e | B) 1-b, 2-c, 3-a, 4-d, 5-e |
| C) 1-b, 2-e, 3-c, 4-d, 5-a | D) 1-b, 2-c, 3-d, 4-e, 5-a |

69. Match the terms in Group *I* with the structures in Group *II* with which they are associated.

- | <u>Group I</u>             | <u>Group II</u>            |
|----------------------------|----------------------------|
| 1. Hinge                   | a. Fold                    |
| 2. Slip                    | b. Fault                   |
| 3. Stretching              | c. Lination                |
| 4. Penetrative             | d. Fabric                  |
| 5. Plumose                 | e. Joint                   |
| A) 1-a, 2-b, 3-c, 4-d, 5-e | B) 1-b, 2-c, 3-a, 4-d, 5-e |
| C) 1-b, 2-a, 3-c, 4-d, 5-e | D) 1-a, 2-c, 3-d, 4-e, 5-b |

70. Match the following mineral deposits with their corresponding process of origin

- | <u>Deposit</u>             | <u>Process</u>                  |
|----------------------------|---------------------------------|
| 1. Diamond in kimberlite   | a. Residual process             |
| 2. Chromite in dunite      | b. Sedimentary precipitation    |
| 3. Gold in point bars      | c. Magmatic segregation         |
| 4. Banded iron formation   | d. Disseminated crystallisation |
| 5. Kaolin deposit          | e. Mechanical concentration     |
| A) 1-a; 2-b; 3-c; 4-d; 5-e | B) 1-d; 2-c; 3-e; 4-b; 5-a      |
| C) 1-c; 2-d; 3-e; 4-b; 5-a | D) 1-d; 2-e; 3-c; 4-b; 5-a      |

71. Which of the following has more alumina?

- A) Andesites      B) Basalt      C) Rhyolite      D) Trachytes

72. The chemical analysis of a plagioclase yielded 45% SiO<sub>2</sub> and 35% Al<sub>2</sub>O<sub>3</sub> and the remaining is (Na<sub>2</sub>O + CaO). What is it likely?

- A) Albite      B) Oligoclase      C) Labradorite      D) Anorthite

73. Which one among the following is **not** an alkali amphibole mineral?

- A) Arfvedsonite      B) Glaucothane      C) Barkevikite      D) Riebeckite

74. Which is the commonest end-member molecule in garnet?

- A) Almandine      B) Andradite      C) Grossular      D) Pyrope

75. Which mica is commonly seen in kimberlite?  
 A) Muscovite    B) Biotite    C) Phlogopite    D) Lepidolite
76. Match the minerals in **Group I** with their family in **Group II**.
- |    | <u><b>Group I</b></u> | <u><b>Group II</b></u> |
|----|-----------------------|------------------------|
| P. | Fuchsite              | 1. Feldspar            |
| Q. | Phengite              | 2. Clay                |
| R. | Celsian               | 3. Spinel              |
| S. | Gahnite               | 4. Mica                |
- 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. Which of the following is maintained as a geo-heritage site by the Geological Survey of India?  
 A) Sasthankotta lake                      B) Vembanad Lake  
 C) Varkala cliff                              D) Chavara placers
78. What name is given to the submarine benthic zone in the depth range of 4-5 km?  
 A) Pelagic                      B) Abyssal                      C) Hadal                      D) Bathyal
79. Which of the following mica minerals is formed at the lowest temperature?  
 A) Muscovite                                  B) Sericite  
 C) Zinnawaldite                              D) Glauconite
80. Which of the following trilobite suture types is the rarest?  
 A) Metaparion                                  B) Proparion  
 C) Gonatoparian                              D) Opisthoparian
81. What is the geological age of the fossil Aulacopleura?  
 A) Cambrian                                  B) Ordovician  
 C) Silurian                                      D) Devonian
82. By which process the Cenozoic brachiopod Tegulorhynchia got evolved into Notosaria?  
 A) Ontogenic allometry                      B) Recapitulation  
 C) Heterotopy                                  D) Heterochrony
83. Which Biologist proclaimed "*ontogeny recapitulates phylogeny*"?  
 A) Charles Darwin                              B) Von Baer  
 C) Earnest Haeckel                              D) Steve Gould
84. What is *Megaloceros*?  
 A) Cretaceous dinosaur                      B) Jurassic ammonoid  
 C) Triassic amphibian                              D) Ice-age mammal
85. Which is the most common Lithium-bearing mineral?  
 A) Zinnawaldite                                  B) Lepidolite  
 C) Amblygonite                                  D) Spodumene

86. In which organism the oldest visual system was noticed?  
 A) Trilobite B) Graptolite  
 C) Ammonoid D) Lamellibranch
87. What causes Fe to precipitate as sulphide or carbonate in certain sedimentary or surficial environments?  
 A) Excess S and CO<sub>2</sub> B) Nonavailability of oxygen  
 C) Change in pH D) Increase in temperature
88. Which is the correct arrangement of minerals as per increasing susceptibility to chemical weathering?  
 A) Halite - Calcite -Gypsum - Olivine - Quartz - Hematite  
 B) Halite -Gypsum - Calcite - Olivine - Quartz - Hematite  
 C) Halite -Gypsum - Calcite - Olivine- Hematite - Quartz  
 D) Calcite - Halite -Gypsum - Olivine - Quartz - Hematite
89. Match the following sets of minerals with their crystal system:  
 1. Fluorite a. Isometric  
 2. Nepheline b. Hexagonal  
 3. Anhydrite c. Orthorhombic  
 4. Talc d. Monoclinic  
 5. Kyanite 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. Which of the following represents a pan-cake shaped strain ellipsoid?  
 A)  $\mathbf{X} = \mathbf{Y} \geq \mathbf{Z}$  B)  $\mathbf{X} > \mathbf{Y} = \mathbf{Z}$   
 C)  $\mathbf{X} \gg \mathbf{Y} \geq \mathbf{Z}$  D)  $\mathbf{X} \geq \mathbf{Y} \gg \mathbf{Z}$
91. Associated with which rock the world's largest Ilmenite deposit occurs?  
 A) Granite B) Basalt C) Anorthosite D) Gabbro
92. With which of the structures the Mid Proterozoic Uranium deposits are associated?  
 A) Fold B) Fault  
 C) Unconformity D) Shear
93. Which of the following landforms is coalesced alluvial fans?  
 A) Arroyo B) Bajada C) Bjord D) Cuesta
94. To which of the pyroxene series the mineral Eulite belongs?  
 A) Enstatite-Ferrosilite B) Diopside-Hedenbergite  
 C) Augite-Ferroaugite D) Clinoenstatite-Clinohypersthene
95. Which of the following do not contribute to the horizontal stress on the lithosphere?  
 A) Ridge push B) Slab pull  
 C) Basal drag D) Isostasy

96. Which parameters are related in *hypsothetic analysis*?
- A) Basin area and Drainage density  
 B) Land area and water-covered area  
 C) Gradient and velocity of a stream  
 D) Area and altitude
97. By which of the following processes *Greisen* is formed?
- A) Postmagmatic metasomatic alteration of granite  
 B) Contact metamorphism of carbonate rock by mafic intrusion  
 C) Contact metamorphism of carbonate rock by felsic intrusion  
 D) Hydrothermal replacement
98. Which of the following works well for fracturing in a tensile regime?
- A) Griffith criterion                      B) Coulomb criterion  
 C) von Mises criterion                    D) Donath and Park criterion
99. If a rock is having angle of internal friction of  $30^\circ$  and in a stress field where the maximum principal stress is vertical what would be the type of the fault formed?
- A) Normal fault dipping  $60^\circ$       B) Reverse fault dipping  $30^\circ$   
 C) Vertical strike-slip fault          D) Low angle oblique-slip fault
100. Match the economic deposits in **Group I** with their industrial use in **Group II**.
- | <u>Group I</u> | <u>Group II</u>    |
|----------------|--------------------|
| P. Kyanite     | 1. Paint making    |
| Q. Fluorite    | 2. Gemstone        |
| R. Gypsum      | 3. Cement industry |
| S. Tourmaline  | 4. Glass industry  |
| T. Ilmenite    | 5. Refractory      |
- A) P-4, Q-1, R-2, S-3, T-5      B) P-5, Q-4, R-3, S-2, T-1  
 C) P-3, Q-5, R-1, S-2, T-4      D) P-3, Q-1, R-4, S-2, T-5
101. The terms cutans and *glæbules* are used to describe the structure of which of the following?
- A) Coal                      B) Soil                      C) Microflora              D) Microfauna
102. What is the range of Reynolds number at which the transition from laminar to turbulent flow occurs in open channels?
- A) 500 to 2000      B) 100 to 500      C) 50 to 100      D) 10 to 50
103. Which substance constitute the trilobite eyes?
- A) Cryptocrystalline silica      B) Calcite crystals  
 C) Apatite crystals                  D) Organic gel
104. Which of the following gives the temperature-pressure range of diagenesis?
- A)  $0-100^\circ\text{C}$  and  $1-100$  bars      B)  $0-200^\circ\text{C}$  and  $1-200$  bars  
 C)  $0-250^\circ\text{C}$  and  $1-500$  bars      D)  $0-300^\circ\text{C}$  and  $1-1000$  bars

105. What is the normal range of geothermal gradient?  
 A) 5-10 °C per km                      B) 10-20 °C per km  
 C) 20-30 °C per km                      D) 30-40 °C per km
106. What is the porosity of uniform spheres of equal size with face-centered cubical packing?  
 A) 0.28                      B) 0.38                      C) 0.48                      D) 0.58
107. In which of the following environments *flaser beddings* are typically formed?  
 A) Glacial                      B) Lacustrine                      C) Turbidite                      D) Tidal
108. In which of the following folds the *dip isogons* are parallel to the axial trace?  
 A) Similar fold                      B) Concentric fold  
 C) Parallel fold                      D) Fan fold
109. Where can we expect *domino system* of faults?  
 A) Subduction zone                      B) Rifted portion of the upper crust  
 C) Active continental margins                      D) Collision belts
110. Match the pioneers in Geology in **Group I** with the classic text books they authored in **Group II**.
- | <u>Group I</u>   | <u>Group II</u>                                  |
|------------------|--|
| P) Arthur Holmes | 1. <i>Principles of Isotope Geology</i> (1977)   |
| Q) N. L. Bowen   | 2. <i>Folding and Fracturing of Rocks</i> (1967) |
| R) F.J.Pettijohn | 3. <i>Sedimentary Rocks</i> (1949)               |
| S) J.G. Ramsay   | 4. <i>Evolution of Igneous Rocks</i> (1928)      |
| T) Gunter Faure  | 5. <i>Principles of Physical Geology</i> (1944)  |
- A) P-4, Q-1, R-3, S-2, T-5                      B) P-3, Q-2, R-1, S-4, T-5  
 C) P-3, Q-4, R-1, S-2, T-5                      D) P-5, Q-4, R-3, S-2, T-1
111. Match the minerals in **Group I** with their optical nature in **Group II**.
- | <u>Group I</u> | <u>Group II</u>      |
|----------------|----------------------|
| P. Beryl       | 1. Isotropic         |
| Q. Muscovite   | 2. Uniaxial positive |
| R. Halite      | 3. Uniaxial negative |
| S. Zircon      | 4. Biaxial positive  |
| T. Diopside    | 5. Biaxial 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. Which is the correct arrangement of folds with increasing inter-limb angle?  
 A) Isoclinal – tight – close – open - gentle  
 B) Tight – isoclinal – close – open - gentle  
 C) Isoclinal – tight – close – gentle – open  
 D) Isoclinal - close – tight – open – gentle

113. Match the minerals in **Group I** with their highest producer State in India in **Group II**.

	<u><b>Group I</b></u>	<u><b>Group II</b></u>
P.	Copper ore	1. Madhya Pradesh
Q.	Coal	2. Jharkhand
R.	Chromite	3. Tamil Nadu
S.	Gypsum	4. Odisha
T.	Magnesite	5. Rajasthan

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

114. Which is the correct order of arrangement of ions in the order of increasing ionic radius?

- A)  $\text{Al}^{3+} - \text{Si}^{2+} - \text{Ti} - \text{Mg} - \text{Na} - \text{Cl}$   
 B)  $\text{Si}^{2+} - \text{Al}^{3+} - \text{Ti} - \text{Mg} - \text{Na} - \text{Cl}$   
 C)  $\text{Si}^{2+} - \text{Al}^{3+} - \text{Ti} - \text{Na} - \text{Mg} - \text{Cl}$   
 D)  $\text{Si}^{2+} - \text{Ti} - \text{Al}^{3+} - \text{Mg} - \text{Na} - \text{Cl}$

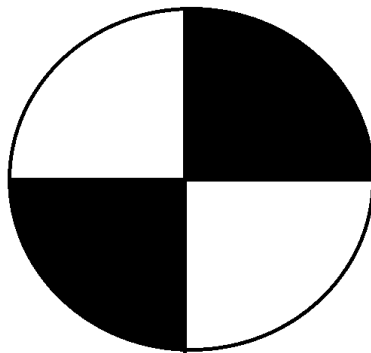
115. Which is the correct order of radioactive nuclides arranged in terms of decreasing half-life?

- A)  $\text{U}^{238} - \text{Sm}^{147} - \text{Rb}^{87} - \text{Re}^{187} - \text{K}^{40} - \text{C}^{14}$   
 B)  $\text{Sm}^{147} - \text{Rb}^{87} - \text{Re}^{187} - \text{U}^{238} - \text{C}^{14} - \text{K}^{40}$   
 C)  $\text{Sm}^{147} - \text{Rb}^{87} - \text{Re}^{187} - \text{U}^{238} - \text{K}^{40} - \text{C}^{14}$   
 D)  $\text{Rb}^{87} - \text{Sm}^{147} - \text{Re}^{187} - \text{U}^{238} - \text{K}^{40} - \text{C}^{14}$

116. Which is the correct order of faces of an isometric crystal arranged in terms of decreasing distance from the centre of a stereogram?

- A) 001 – 013 – 111 – 021 – 031 – 110  
 B) 001 – 021 – 031 – 013 – 111 – 110  
 C) 001 – 031 – 111 – 021 – 013 – 110  
 D) 110 – 031 – 013 – 111 – 021 – 001

117. The diagram of focal mechanism of which type of fault is shown below?



- |    |              |    |                   |
|----|--------------|----|-------------------|
| A) | Normal fault | B) | Reverse fault     |
| C) | Thrust       | D) | Strike-slip fault |

118. At what facies would a portion of the lithosphere getting delaminated be?
- |                |               |
|----------------|---------------|
| A) Amphibolite | B) Granulite  |
| C) Eclogite    | D) Sanidinite |
119. Upto what temperature the mineral quartz deforms by brittle mechanism?
- |               |               |
|---------------|---------------|
| A) 100-150 °C | B) 200-250 °C |
| C) 300-350 °C | D) 400-450 °C |
120. Geomorphologists use the term *equifinality* to mean which of the following?
- |  |
|--|
| A) Any landform will finally be converted to a smooth planar surface.          |
| B) There exists an equilibrium between erosion and uplift on a global scale.   |
| C) All surficial processes leads to a common final landform, if uninterrupted. |
| D) Identical landforms can be produced by a number of alternative processes.   |
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