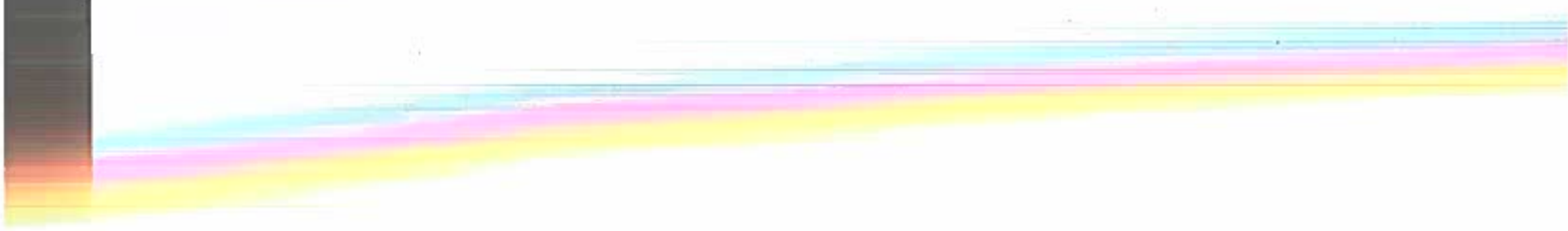






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## EARTH SCIENCES

### Paper - III

1. Satellite used by global positioning systems is, normally at an altitude of about :  
(A) 16,000 km      (B) 20,000 km  
(C) 24,000 km      (D) 28,000 km
2. Reflectance, which follows Snell's law, from a surface is called :  
(A) Specular reflection  
(B) Spectral reflection  
(C) Plankton's reflection  
(D) Peculiar reflection
3. Which of the following engineering structures is located on river Krishna ?  
(a) Nagarjunasagar dam  
(b) Bhakra dam  
(c) Srisaïlam dam  
(d) Prakasam barrage  
(A) (a)                      (B) (b) and (c)  
(C) (a), (c) and (d)      (D) (b) and (d)
4. Which of the following tunnels is most stable ?  
(a) Tunnel located in massive and unweathered granite  
(b) Tunnel located in an anticline  
(c) Tunnel located in a syncline  
(d) Tunnel located in shear zone  
(A) (a)                      (B) (b)  
(C) (c)                      (D) (d)
5. \_\_\_\_\_ is the concentration of an indicator element above which a sample is considered anomalous.  
(A) Threshold  
(B) Negative anomaly  
(C) Dispersion  
(D) Normal Back ground Value
6. Estimation of Tonnage of mineral deposits is evaluated with :  
(A) Reconnaissance surveys  
(B) Geochemical surveys  
(C) Remote sensing studies  
(D) Weight of ore and volume of ore
7. A saturated but relatively impermeable material that does not yield appreciable quantities of water is known as :  
(A) Confined Aquifer  
(B) Aquiclude  
(C) Unconfined Aquifer  
(D) Aquifuge
8. Excessive Nitrate concentrations in drinking water causes :  
(A) Fluorosis (Dental)  
(B) Methemoglobinemia  
(C) Fluorosis (Skeletal)  
(D) Skin Allergies
9. Soil creep on a gentle slope in a glaciated environment is known as :  
(A) Deflation              (B) Solifluction  
(C) Abrasion                (D) Nivation



10. Energy radiated into space by Sun at a steady rate is known as :

- (A) Albedo (B) Diffusion  
(C) Solar Constant (D) Solar flare

11. Match the following :

Tree	Forest Cover Type
(a) Sal	(i) Coniferous
(b) Pine	(ii) Tropical Deciduous
(c) Teak	(iii) Desert
(d) Cactus	(iv) Tropical Monsoon

Codes :

- |           |      |       |       |
|-----------|------|-------|-------|
| (a)       | (b)  | (c)   | (d)   |
| (A) (i)   | (ii) | (iii) | (iv)  |
| (B) (iv)  | (i)  | (ii)  | (iii) |
| (C) (ii)  | (i)  | (iv)  | (iii) |
| (D) (iii) | (i)  | (ii)  | (iv)  |

12. When the average annual rainfall is 25% less than usual, then it is known as :

- (A) Hydrological Drought  
(B) Meteorological Drought  
(C) Agricultural Drought  
(D) Ecological Drought

13. Simla hills are located in :

- (A) Dhauladhar Range  
(B) Himachal Range  
(C) Siwalik Range  
(D) Kumaon Range

14. The characteristic mineral of charnockites is :

- (A) Olivine  
(B) Biotite  
(C) Hypersthene  
(D) Hornblende

15. Which one of the following mineral assemblages indicates quartz-albite-muscovite-chlorite sub-facies metamorphism of a basic schist ?

- (A) Quartz-albite-muscovite  
(B) Calcite-epidote-tremolite-quartz  
(C) Albite-epidote-chlorite-calcite  
(D) Quartz-muscovite-chlorite-albite

16. The change in either quality or quantity of the color of a mineral on rotation of microscope stage under polarized light is called :

- (A) Polarization color  
(B) Pleochroism  
(C) Extinction  
(D) Twin bling

17. The stress ellipsoid of hydrostatic stress is defined by :

- (A)  $\sigma_1 = \sigma_2 = \sigma_3$   
(B)  $\sigma_1 > \sigma_2 = \sigma_3$   
(C)  $\sigma_1 < \sigma_2 < \sigma_3$   
(D)  $\sigma_1 > \sigma_2 < \sigma_3$



18. The surface defined by connecting all the hinge lines of stacked fold surfaces is called :
- (A) Fold hinge surface  
(B) Axial surface  
(C) Axial plane  
(D) Axial trace
19. Concentric folds are folds repeated in depth in which thickness of all the layers :
- (A) has increased at the crests and decreased at the limbs  
(B) has decreased at the crests and increased at the limbs  
(C) has remained constant  
(D) has decreased throughout the sequence
20. *Glossopteris* and *gangamopteris* are the plant fossils of :
- (A) Gondwana system  
(B) Cuddapah system  
(C) Dharwar system  
(D) Siwalik system
21. An example of echinoid is :
- (A) *Paradoxides* (B) *Conus*  
(C) *Lamelibranch* (D) *Micraster*
22. Which one of the following pairs is not correctly matched ?
- (A) Fossils with restricted time but wide distribution are called \_\_\_\_\_ *Index fossils*.  
(B) Vertebrates give birth to \_\_\_\_\_ *Live babies*.  
(C) Clock-wise coiling in gastropods is called \_\_\_\_\_ *sinistral*.  
(D) Siwalik period is considered to be the age of \_\_\_\_\_ *Mammals*.
23. Breccia and conglomerate belong to :
- (A) Transitional facies  
(B) Marine facies  
(C) Continental facies  
(D) Transitional and marine facies
24. When the beds lying below and above the surface of erosion or non-deposition are almost parallel, the unconformity is known as :
- (A) Angular unconformity  
(B) Non conformity  
(C) Disconformity  
(D) Local unconformity
25. Gondwana formations in Telangana region host rich deposits of :
- (A) Gold (B) Bauxite  
(C) Baryte (D) Coal



26. When oxygen is so depleted in an aquatic environment that virtually ceased all the aerobic biological activity in a mass of water, the environment is known as :
- (A) Oxidic environment  
(B) El Nino  
(C) Anoxic environment  
(D) La Nina
27. Earth's great oceanic conveyor belt carries :
- (A) Thermal Signatures  
(B) Acoustic Signatures  
(C) Paleo current Signatures  
(D) Geochemical Signatures
28. The rich marine resource polymetallic nodules are formed :
- (A) due to weathering  
(B) on the sea bottom  
(C) due to volcanic eruptions  
(D) on the continental crust
29. In silicate minerals Sr substitutes readily for :
- (A) Fe (B) Mg  
(C) Zr (D) Ca
30. Fill in the blank in the following metamorphic reaction :
- Muscovite + \_\_\_\_\_ =  
K-feldspar + Andalusite + H<sub>2</sub>O
- (A) Nepheline (B) Quartz  
(C) Sillimanite (D) Kyanite
31. Which one of the following is correctly matched ?
- (A) Lithophile elements have strong affinity for \_\_\_\_\_ O and Si.  
(B) Au has strong affinity for \_\_\_\_\_ Oxygen.  
(C) SMOW means \_\_\_\_\_ same mean oceanic water.  
(D) Apalite fractionates \_\_\_\_\_ HREE.
32. Singhbhum copper deposit is concentrated in :
- (A) Stock work (B) Shear zone  
(C) Ladder vein (D) Saddle reef
33. Sublimation is a process related to :
- (A) Palingenesis  
(B) Ore mineralization  
(C) Doliomorphism  
(D) Diaphthoresis
34. Kothagudem coal is formed during the :
- (A) Archaen  
(B) Siwalik  
(C) Gondwana  
(D) Proterozoic
35. The boundary between Western and Eastern Dharwar Cratons is marked by :
- (A) Closepet granite  
(B) Chitradurga shear zone  
(C) Kolar schist belt  
(D) Nellore schist belt

36. Which one of the following basins belongs to Mesoproterozoic ?
- Sonrai basin
  - Bijawar basin
  - Cuddapah basin
  - Gwalior basin
37. Bababudon greenstone belt is located in \_\_\_\_\_ craton.
- EDC (Eastern Dharwar Craton)
  - WDC (Western Dharwar Craton)
  - BC (Bastar Craton)
  - AC (Aravalli Craton)
38. Pleistocene and Holocene Epochs belong to :
- Neocene period
  - Oligocene period
  - Quaternary period
  - Miocene period
39. Ice Age is usually referred to :
- Quaternary period
  - Neocene period
  - Cretaceous period
  - Paleocene period
40. The ratio of  $^{18}\text{O}$  and  $^{16}\text{O}$  isotopes reveals information on variations in :
- Sea floor spreading
  - Diagenesis
  - Plate movements
  - Earth's climate
41. Non-linear difference equations are solved by :
- Iterative method
  - Cobweb model
  - Phase diagram
  - Power series method
42. Which of the following methods is used to restrict the inverse filter to be FIR ?  $H(z)$  is system function and  $h(n)$  is impulse :
- truncating  $h_1(n)$
  - expanding  $h_1(n)$
  - truncating  $H_1(z)$
  - expanding  $H_1(z)$
43. A charge, which, when placed in vacuum from an equal and similar charge repels with a force of  $9 \times 10^3 \text{ N}$ , is known as :
- coulomb
  - milli coulomb
  - micro coulomb
  - pico coulomb
44. "Total flux through any closed surface surrounding charges is equal to the amount of charge enclosed" is :
- Coulomb's square law
  - Gauss's law
  - Maxwell's first law
  - Maxwell's second law



45. In pattern recognition technique clustering is associated by :
- (A) supervised learning
  - (B) unsupervised learning
  - (C) semi supervised learning
  - (D) multi-stage learning
46. Which of the following is **not** an example of global approximation ?
- (A) Response surface methodology
  - (B) Design and experiment of computer experiments
  - (C) Neural network
  - (D) Higher order approximation
47. What was the relationship between South America and Africa during the time the two polar wandering curves overlapped ?
- (A) South America and Africa moved in different directions
  - (B) South America and Africa have never been joined
  - (C) South America and Africa were joined but not moving
  - (D) South America and Africa were joined and were moving
48. Temperature at core can be as high as :
- (A) 2550°C
  - (B) 2300°C
  - (C) 3700°C
  - (D) 3300°C
49. Dominant mechanism of permanent magnetisation of iron-titanium oxide minerals contributing to marine magnetic anomalies is :
- (A) Chemical remanent magnetisation
  - (B) Thermo remanent magnetization
  - (C) Viscous remanent magnetisation
  - (D) Detrital remanent magnetisation
50. Which one of the following is not helpful in characterizing plate boundaries ?
- (A) Volcanism
  - (B) High thermal gradients
  - (C) Earthquakes
  - (D) Mean sea level
51. Earthquake shear wave velocity depends only on :
- (A) Bulk modulus
  - (B) Shear modulus
  - (C) Bulk modulus and density
  - (D) Shear modulus and density
52. The output of a geophone is proportional to ground \_\_\_\_\_.
- (A) Displacement
  - (B) Velocity
  - (C) Acceleration
  - (D) Strain
53. Which one of the following statements is **not** correct ?
- (A) Eotvos correction is applied for airborne and shipborne gravity survey
  - (B) Free-air and Bouguer correction are always opposite
  - (C) Lacoste - Romberg gravimeter is a stable gravimeter
  - (D) Terrain correction is always positive for land gravity survey



54. Magnetic anomaly is symmetrical and independent of the strike of the body at latitudes of :

- (A) 0° (B) 45°  
(C) 90° (D) All latitudes

55. Match the items in Group - I with those in Group - II :

Group - I	Group - II
(a) VLF	(i) $10^{-4}$ to 1 Hz
(b) GPR	(ii) 400 to 2000 Hz
(c) MT	(iii) 20 KHz to 25 KHz
(d) Slingram	(iv) 25 MHz to 1.2 GHz

Codes :

- |     | (a)   | (b)  | (c)   | (d)   |
|-----|-------|------|-------|-------|
| (A) | (ii)  | (i)  | (iv)  | (iii) |
| (B) | (iii) | (iv) | (i)   | (ii)  |
| (C) | (i)   | (iv) | (iii) | (ii)  |
| (D) | (iii) | (ii) | (i)   | (iv)  |

56. The correct sequence in which the following EM methods should be arranged in order of their increasing depth of investigation is \_\_\_\_\_.

P - Very Low Frequency Method

Q - Magnetotelluric Method

R - Ground Penetrating Radar Method

S - Slingram Method

- (A)  $P < R < S < Q$   
(B)  $S < R < P < Q$   
(C)  $R < P < S < Q$   
(D)  $P < R < Q < S$

57. Which one of the following seismic features indicates presence of hydrocarbon but not the lithological boundary ?

- (A) Chaotic reflections  
(B) Dim spot  
(C) Flat spot  
(D) Polarity reversal

58. Seismic phases which are recorded in the shadow zones are :

- (A) PcP (B) PmP  
(C) PKIKP (D) PKKP

59. Which of the following is the correct statement ?

- (A) Gas and oil contact is assessed by Induction log  
(B) Density is determined by Gamma-Gamma log  
(C) Cavity is located by self-potential log  
(D) Shale and Sand boundary is demarcated by microlog

60. Which combination of logs is used to identify a gas zone based on the characteristic shape of the derived porosity plots ?

- (A) Sonic and density  
(B) Resistivity and density  
(C) Density and neutron  
(D) Sonic and neutron



61. T-S diagrams of Indian ocean have identified \_\_\_\_\_ number of water masses.
- (A) 8 (B) 5  
(C) 10 (D) 12
62. The Agulhas current retroflects to flow eastwards in response to the change in \_\_\_\_\_ vorticity.
- (A) Potential (B) Planetary  
(C) Relative (D) Absolute
63. In ocean, carbon dioxide dissolution rate decreases with :
- (A) increasing wind speed  
(B) increasing unbalance  
(C) increasing temperature  
(D) increasing pressure
64. Sliding of seafloor beneath a continent or island arc is known as :
- (A) Obfuscation (B) Subduction  
(C) Obliteration (D) Obduction
65. The surface layer of ocean where there is sufficient light for photosynthesis is called :
- (A) Areal zone  
(B) Safe zone  
(C) Photic zone  
(D) Synthetic zone
66. Albedo over a fresh snow cover is about \_\_\_\_\_%.
- (A) 50 (B) 75  
(C) 95 (D) 30
67. Forecasting of Thunderstorm activity is in the \_\_\_\_\_ range category.
- (A) Short (B) Medium  
(C) Long (D) Now cast
68. Doppler Radar measures the intensity of Hailstorm, Tornado and Rain rate with \_\_\_\_\_ sensor.
- (A) Active microwave  
(B) Passive microwave  
(C) Visible  
(D) Infrared
69. The difference between \_\_\_\_\_ and \_\_\_\_\_ vorticities is planetary vorticity.
- (A) Absolute  
(B) Relative  
(C) Angular  
(D) Both (A) and (B)



70. Coral reef developed along the margins of a volcano is called :
- (A) sea mount      (B) a toll  
(C) barrier reef    (D) fringing reef
71. The occurrence of ENSO is in the period range of \_\_\_\_\_ years.
- (A) 2 - 5            (B) 5 - 7  
(C) 7 - 9            (D) 10 - 12
72. Mean height of somalijet in the southwest monsoon season is \_\_\_\_\_ km.
- (A) 2.8              (B) 5.2  
(C) 10.5             (D) 16.1
73. Which of the following is not a terrestrial planet ?
- (A) Mercury        (B) Venus  
(C) Earth            (D) Jupiter
74. Which one of the following processes reduces carbon in atmosphere and helps in climate change mitigation ?
- (A) Pyrolysis  
(B) Automobile emission  
(C) Use of natural resources  
(D) Photosynthesis
75. Chlorophyll of the ocean is measured by the \_\_\_\_\_ satellite.
- (A) Oceansat - 2  
(B) Kalpana  
(C) TIROS-I  
(D) NIMBVS-II

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