

Ph.D. ENTRANCE EXAMINATION, APRIL 2021**GEOLOGY**

Time : Two Hours

Maximum : 50 Marks

Section A*Answer all questions.*

1. Crevasses in glaciers do not extend to the base of glacier because _____.
 - a) Lack of sufficient stress.
 - b) Resistance exerted by the valley floor.
 - c) Both a) and b).
 - d) None of the above.
2. The igneous intrusions are _____ than the rocks they cut across.
 - a) Older.
 - b) Younger.
 - c) Both a) and b).
 - d) None of the above.
3. The erosional contact separating a younger sedimentary formation from an igneous or metamorphic units.
 - a) Hiatus.
 - b) Disconformity.
 - c) Nonconformity.
 - d) None of the above.
4. Panna Shale is associated with _____ Group.
 - a) Bhandar.
 - b) Kaimur.
 - c) Rewa.
 - d) None of the above.
5. A _____ is the angle that a line makes with a horizontal line in that plane.
 - a) Declination.
 - b) Rake.
 - c) Plunge.
 - d) None of the above.
6. Grain roughness is the ratio between :
 - a) Flow depth and median grain size.
 - b) Flow depth and maximum grain size.
 - c) Flow depth and density of grains.
 - d) None of the above.

Turn over

7. Which of the following is known as 'Age of fishes' ?
- a) Ordovician.
 - b) Silurian.
 - c) Devonian.
 - d) None of the above.
8. The remnant of the upper overthrust block, separated by erosion from the main area of this block and surrounded by the worn surface of the lower block :
- a) Nappe.
 - b) Klippe.
 - c) Fenster.
 - d) None of the above.
9. _____ texture is the arrangement where diversely oriented crystals of a mineral are irregularly scattered within much larger host crystals of another mineral.
- a) Poikilitic.
 - b) Hyalopilitic.
 - c) Trachytic.
 - d) None of the above.
10. The Froude number expresses the ratio between _____ and _____ forces.
- a) Inertial and gravitational.
 - b) Inertial and viscous.
 - c) Inertial and frictional.
 - d) None of the above.
11. Trend of Bhavani shear zone, South India :
- a) NNW-SSE.
 - b) N-S.
 - c) NW-SE.
 - d) NE-SW.
12. Metamorphism that affects a large body of rock, and covering a vast lateral extent :
- a) Contact metamorphism.
 - b) Orogenic metamorphism.
 - c) Impact Metamorphism.
 - d) Hydrothermal Metamorphism.
13. Trilobites became extinct by the end of :
- a) Carboniferous.
 - b) Devonian.
 - c) Permian.
 - d) None of the above.
14. A pervasive, parallel foliation of fine-grained platy minerals in a direction perpendicular to the direction of maximum stress :
- a) Slaty cleavage.
 - b) Pucker lineation.
 - c) Stylolite.
 - d) None of the above.

15. The sedimentary feature resulting from superimposition of unidirectional flows on oscillatory currents :
- a) Planar cross-stratification. b) Hummocky cross-stratification.
c) Trough cross-stratification. d) None of the above.
16. Which of the following wavelengths most suits water vapour imagery by satellites ?
- a) 6.7 microns. b) 12 microns.
c) 0.7 microns. d) None of the above.
17. Eclogite are characterized by _____.
- a) Hedenbergite. b) Aegirine.
c) Omphacite. d) Pigeonite.
18. Which of the following is not mined from Chavara placer deposit ?
- a) Rutile. b) Ilmenite.
c) Sillimanite. d) None of the above.
19. Radiolaria forms part of _____ oozes.
- a) Carbonaceous. b) Siliceous.
c) Psammitic. d) None of the above.
20. In AKF diagram A stands for _____.
- a) $\text{Al}_2\text{O}_3\text{-NaO-K}_2\text{O}$. b) Al_2O_3 .
c) $\text{Al}_2\text{O}_3\text{+Fe}_2\text{O}_3\text{-NaO-K}_2\text{O-CaO}$. d) None of the above.
21. The Ninety East Ridge system was formed due to the magmatism associated with _____ hotspot.
- a) Jan Mayen. b) Kerguelen.
c) Hoggar. d) None of the above.
22. _____ bonding may be described as the sharing of free electrons among a lattice of positively charged metal ions.
- a) Ionic. b) Covalent.
c) Metallic. d) None of the above.

23. Stromatolites are not found in :
- a) Vempalle formation.
 - b) Tadpatri formation.
 - c) Cumbum formation.
 - d) None of the above.
24. Rock composed of broken fragments in a dark black matrix of microscopic grains
- a) Fault gouge.
 - b) Crushed breccia.
 - c) Ultramylonite.
 - d) Pseudotachylite.
25. Squid is a _____.
- a) Arthropod.
 - b) Cephalopod.
 - c) Crustacea.
 - d) None of the above.

(25 × 1 = 25 marks)

Section B

*Give an account of any **five** of the following.
Answer for a question should not exceed 20 sentences.
Draw figures wherever necessary.*

- 26. Self-Potential method of electric surveying.
- 27. Principle of flame photometer.
- 28. Binary eutectic illustrated with an example.
- 29. Microwave in remote sensing.
- 30. Microfossils in petroleum exploration.
- 31. Significance of Reynold's equation in studying fluvial flow behaviour.
- 32. Residual soil profile and significance of E and B horizons.
- 33. Convection currents in mantle of earth and their role in plate movements.

(5 × 5 = 25 marks)