

2025

**GEOLOGY**

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

*All the questions are compulsory.*

*The figures in the right margin indicate full marks for the questions.*

*Answer Questions Nos. 1 to 8 by choosing the correct one from the four alternatives given A, B, C and D and rewrite.*

1. Age of the Earth revealed by Radioactive method is estimated as \_\_\_\_\_ million years old. 1  

(A) 3000	(B) 3500
(C) 4000	(D) 4500
  
2. In normal class of Tetragonal system, there are \_\_\_\_\_ axis of symmetry. 1  

(A) five	(B) seven
(C) nine	(D) thirteen

P.T.O.

3. Which of the following minerals posses pearly luster? 1
- (A) Calcite (B) Muscovite  
(C) Microcline (D) Quartz
4. Amongst the following, which mineral is crystallized in Tetragonal System? 1
- (A) Quartz (B) Borite  
(C) Zircon (D) Fluorite
5. The most favourable environment for the preservation of fossil is \_\_\_\_\_.1
- (A) Terrestrial (B) Lacustrine  
(C) Fluvial (D) Marine
6. In which of the following districts of Manipur, chromite occurs ? 1
- (A) Ukhrul and Senapati (B) Kangpokpi and Senapati  
(C) Bishnupur and Kangpokpi (D) Ukhrul and Tengnoupal
7. \_\_\_\_\_ is an example of complex ore. 1
- (A) Pyrite (B) Chalcopyrite  
(C) Haematite (D) Magnetite
8. \_\_\_\_\_ is a variety of coal. 1
- (A) Anthracite (B) Bauxite  
(C) Galena (D) Sphelerite

*For Question Nos. 9 and 10 are Assertion and Reason based questions. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the codes (A), (B), (C) and (D) as given below.*

9. Statement-I (A) : Trenches are formed at convergent margins of the two oceanic tectonic plates.

Statement-II (R) : After collision of two oceanic tectonic plates, one plate has overridden the other plate. 1

- (A) Statement-I is true but the Statement-II is false.
- (B) Statement-I is false but the Statement-II is true.
- (C) Both the Statement-I and Statement-II are false.
- (D) Both the Statement-I and Statement-II are true and Statement-II is the correct explanation of Statement-I.

10. Statement-I (A) : Fossils can be preserved in the sedimentary rocks only not in Igneous and Metamorphic rocks.

Statement-II (R) : Sedimentary rock sequences containing index fossils are easy to determine their ages. 1

- (A) Both Statements-I and II are false.
- (B) Both Statement-I and II are true and Statement-II is the exact explanation of Statement-I.
- (C) Both Statement-I and II are true but both statements are not related to each other.
- (D) Statement-I is false but Statement-II is true.

*Answer questions Nos. 11 to 17 in one word or one sentence each.*

11. What is focus (hypocentre) of an earthquake? 1
12. Define streak of a mineral? 1
13. Arrange the following minerals according to their hardness in ascending order :  
Quartz : gypsum : orthoclase : apatite 1
14. Define Palaeontology. 1
15. What are gangue minerals? 1
16. How do you prove, "bauxite" is a simple ore? 1
17. What will happen if petroleum occurs in all countries? 1

*Answer Question No. 18 to 27 in about 30 - 40 words each.*

18. Define erosion. 2
19. What problem will be faced if a civil engineer does not have geological knowledge? 2
20. Convert the following Weiss symbols into Miller indices : 2
- (i) a, b, c
- (ii)  $a_1, \bar{2}a_2, \bar{2}a_3, \infty c$
21. In Brachiopoda, how Articulata is differentiated from Inarticulata? 2
22. Insects and Worms can not be preserved as fossils. Why? Give reasons. 2

23. Limestone deposits in high Himalaya is not considered as economic mineral of the country. Why? Give reasons. 2
24. How sandstones are used as a good constructional materials? Give reasons. 2
25. Explain why the tenor of gold is very low whereas that of iron is very high. 2
26. Draw a neat and clean diagram showing that the normal class of Tetragonal system has five planes of symmetry. 2
27. Draw a neat and clean diagram of gastropod shell and label the parts. 2

*Answer Question Nos. 28 to 33 in about 40-50 words each.*

28. Classify volcanoes based on their record of activities. Explain them briefly. 3

*Or*

Classify seismic waves and explain the characteristics of each type.

29. How Calcite is differentiated from corundum? 3

*Or*

Distinguish between orthoclase and Garnet.

30. Muscovite is so important to human beings. Why? Give reasons. 3

*Or*

How do you identify minerals in the field ?

31. How is Lamellibranchia classified into different orders? Explain briefly for each order. 3

*Or*

Classify Gastropoda on the basis of their nature of soft parts in which their ages range from Palaeozoic era to recent and explain.

32. Differentiate between Early magmatic mineral deposits and Late magmatic mineral deposits. 3

*Or*

Explain the formation of supergene enrichment of mineral deposits.

33. Read the following passage and answer the following questions.

(a) Organisms possess hard parts capable of fossilisation. The hard parts are composed of minerals like calcite, aragonite, silica, chitin and chitinophosphate. The shells of Mollusca, Brachiopoda exoskeleton of Arthropoda and bones and teeth of vertebrate are found preserved unaltered under all but most adverse conditions. In mollusks, the mantle is located just beneath the shell. The mantle keeps the shell connected to the rest of the animal and is responsible for making the shell, shell continues to grow as mollusks grow. So the length of time it takes to produce a shell can vary from species to species.

(i) What will happen if organisms do not possess hard parts? 1

(ii) Size of the mollusk shell varies from species to species. Why? Give reasons. 2

*Or*

(b) The coiling of direction of snail's shell is controlled by the mother's genotype which is passed down through delayed material inheritance. Over 90% of gastropod species have shell in which direction of the coil is dextral (right handed). In few cases, the coiling is anticlockwise or sinistral.

(i) In case of sinistral coiling of gastropod shell, when the apex of the shell is pointed upward, aperture of the shell will be in which direction from the observer? 1

(ii) Give reason why dextral coiling gastropod shell is more abundant than sinistral coiling type? 2

*Answer Question Nos. 34-36 in about 150-200 words each.*

34. Describe the Nebular hypothesis for the origin of Earth? 5

*Or*

Describe the internal structural of the Earth as revealed by seismic waves.

35. Explain the symmetry elements of Normal Class of Isometric system and give two minerals crystallizing in the system. 5

*Or*

Explain the symmetry elements of Normal Class of Tetragonal system and give two minerals crystallizing in the system.

36. Describe the morphological characters of Lamellibranchia or Brachiopoda. 5