

Origin and Structure of the Earth: Advanced MCQs for NDA

1. Consider the following statements about the Geological Time Scale:

1. The Phanerozoic Eon is divided into three eras: Paleozoic, Mesozoic, and Cenozoic.
2. The boundary between the Cretaceous and Paleogene periods is marked by a major mass extinction event.
3. The Precambrian supereon covers approximately 90% of Earth's history.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

2. With reference to the internal structure of the Earth, the 'Moho Discontinuity' separates:

- (a) The lithosphere from the asthenosphere
- (b) The outer core from the inner core
- (c) The Earth's crust from the mantle
- (d) The upper mantle from the lower mantle

3. Which of the following pairs of rocks is/are correctly matched with their primary characteristic?

1. **Granite:** An intrusive igneous rock with large crystals
2. **Basalt:** An extrusive igneous rock, fine-grained
3. **Sandstone:** A clastic sedimentary rock

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

4. The concept of sea-floor spreading is supported by which of the following pieces of evidence?

1. The age of the oceanic crust increases as we move away from the mid-oceanic ridges.
2. The presence of the same sequence of magnetic anomalies on either side of the ridge.
3. The discovery of the deepest trenches along the continental margins.

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

5. Consider the following statements:

1. **Pangaea** was the supercontinent that existed during the late Paleozoic and early Mesozoic eras.
2. The **Tethys Sea** was the ocean that separated the northern Laurasia and southern Gondwana landmasses.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

6. Which of the following is a metamorphic rock that is primarily formed from limestone?

- (a) Slate
- (b) Marble
- (c) Quartzite
- (d) Gneiss

7. The 'Asthenosphere', a crucial zone for plate tectonics, is a part of the:

- (a) Earth's crust

- (b) Upper mantle
- (c) Lower mantle
- (d) Outer core

8. With reference to the theory of Continental Drift, which of the following was NOT used by Alfred Wegener as evidence?

- (a) The jigsaw-fit of the continental margins.
- (b) Paleomagnetic data from ocean floors.
- (c) Fossil similarities across continents.
- (d) Geological structure matches across oceans.

9. Consider the following pairs:

1. **Divergent Boundary:** Formation of the Himalayas
2. **Convergent Boundary:** Formation of the Mid-Atlantic Ridge
3. **Transform Boundary:** San Andreas Fault

Which of the pairs given above is/are correctly matched?

- (a) 1 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

10. The primary reason for the existence of the Earth's magnetic field is believed to be the:

- (a) Magnetic minerals in the crust
- (b) Dynamo action in the liquid outer core
- (c) Ferromagnetic nature of the solid inner core
- (d) Influence of the Sun's magnetic field

11. Which of the following statements about minerals is/are correct?

1. 'Cleavage' is the way a mineral reflects light, while 'Lustre' is the way it breaks.
2. Quartz is a silicate mineral and has a hardness of 7 on the Mohs scale.
3. All minerals have a definite chemical composition and an ordered internal structure.

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

12. The 'Gutenberg Discontinuity' is associated with the boundary between the:

- (a) Crust and Mantle
- (b) Upper Mantle and Lower Mantle
- (c) Mantle and Outer Core
- (d) Outer Core and Inner Core

13. The 'Ring of Fire', known for frequent earthquakes and volcanic eruptions, is primarily associated with which kind of plate boundary?

- (a) Divergent boundaries
- (b) Convergent boundaries involving oceanic-continental crust
- (c) Transform boundaries
- (d) Convergent boundaries involving continental-continental crust

14. Consider the following statements about rocks:

1. **Coal and shale** are examples of organic sedimentary rocks.
2. **Slate**, which is formed from shale, is an example of a foliated metamorphic rock.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

15. The concept of 'Isostasy', which explains the vertical movement of the Earth's crust, is best demonstrated by:

- (a) The formation of fold mountains
- (b) The principle of icebergs floating in water
- (c) The occurrence of volcanic eruptions
- (d) The process of sea-floor spreading

16. Which of the following geological formations provides direct evidence for the former existence of the supercontinent Gondwana?

- (a) The Deccan Traps in India
- (b) The coal deposits in Antarctica
- (c) The Great Rift Valley in Africa
- (d) The San Andreas Fault in California

17. Consider the following statements:

1. The **inner core** of the Earth is solid due to extremely high temperature.
2. The **outer core** is in a liquid state and is composed mainly of iron and nickel.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

18. The 'Wilson Cycle' describes the:

- (a) Process of metamorphism of rocks
- (b) Process of fossil formation over time
- (c) Sequence of magnetic reversals recorded in rocks
- (d) Sequence of the opening and closing of ocean basins

19. Which of the following is a direct consequence of plate tectonic activity?

1. Formation of Ozone layer
2. Distribution of volcanoes and earthquakes
3. Creation of major mountain ranges

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

20. The principle of 'Uniformitarianism' in geology, often summarized as "the present is the key to the past," was primarily advocated by:

- (a) Alfred Wegener
- (b) James Hutton
- (c) Arthur Holmes
- (d) Harry Hess

21. With reference to the Earth's crust, which of the following statements is/are correct?

1. The **continental crust** is less dense but thicker than the oceanic crust.
2. The **Sima** layer (Silicon and Magnesium) is a major constituent of the continental crust.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

22. The 'Benioff Zone' is associated with:

- (a) Deep-focus earthquakes along a convergent plate boundary
- (b) Shallow-focus earthquakes at mid-ocean ridges

- (c) Volcanic hotspots like Hawaii
- (d) Transform faults like the San Andreas

23. Consider the following pairs of rocks and their metamorphic equivalents:

1. Shale -> Slate
2. Limestone -> Marble
3. Sandstone -> Quartzite

Which of the pairs given above are correctly matched?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

24. The driving force behind the movement of tectonic plates is most accurately attributed to:

- (a) Tidal forces from the Moon and Sun
- (b) The Earth's rotation (Coriolis force)
- (c) Mantle convection currents
- (d) Magnetic field reversals

25. The 'Gondwana' group of sediments in India is known for its rich deposits of:

- (a) Gold and Diamonds
- (b) Coal and Iron ore
- (c) Petroleum and Natural Gas
- (d) Bauxite and Mica

26. Which of the following statements about the lithosphere is correct?

- (a) It includes the entire crust and the uppermost, solid part of the mantle.
- (b) It is a single, unbroken layer that floats on the asthenosphere.
- (c) It is plastic and ductile, allowing for isostatic adjustments.
- (d) Its thickness is uniform across both oceans and continents.

27. The phenomenon where denser oceanic lithosphere sinks and pulls the rest of the plate along at a convergent boundary is known as:

- (a) Ridge Push
- (b) Mantle Plume
- (c) Slab Pull
- (d) Convection Drag

28. The Great North Indian Plain was primarily formed by the depositional activity of the rivers originating from the Himalayas. The rock type that would dominate this region is:

- (a) Igneous
- (b) Metamorphic
- (c) Sedimentary
- (d) A mixture of all three

29. The 'Dharwar' and 'Aravalli' systems in India are primarily known for which type of rocks?

- (a) Young, fossil-rich sedimentary rocks
- (b) Ancient, highly metamorphosed rocks
- (c) Recent volcanic rocks
- (d) Thick limestone deposits

30. Consider the following statements:

1. **P-waves** (Primary waves) can travel through both solids and liquids.
2. **S-waves** (Secondary waves) are slower than P-waves and can only travel through solids.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer Key

1. (d) 1, 2 and 3
2. (c) The Earth's crust from the mantle
3. (d) 1, 2 and 3
4. (a) 1 and 2 only
5. (c) Both 1 and 2
6. (b) Marble
7. (b) Upper mantle
8. (b) Paleomagnetic data from ocean floors.
9. (b) 3 only
10. (b) Dynamo action in the liquid outer core
11. (b) 2 and 3 only (Statement 1 is reversed: Cleavage is how it breaks, Lustre is how it reflects light.)
12. (c) Mantle and Outer Core
13. (b) Convergent boundaries involving oceanic-continental crust
14. (c) Both 1 and 2
15. (b) The principle of icebergs floating in water
16. (b) The coal deposits in Antarctica
17. (b) 2 only (The inner core is solid due to extreme pressure, not temperature.)
18. (d) Sequence of the opening and closing of ocean basins
19. (b) 2 and 3 only (The ozone layer is formed by photochemical reactions in the atmosphere.)
20. (b) James Hutton
21. (a) 1 only (The Sima layer is a major constituent of the oceanic crust.)
22. (a) Deep-focus earthquakes along a convergent plate boundary
23. (d) 1, 2 and 3
24. (c) Mantle convection currents
25. (b) Coal and Iron ore
26. (a) It includes the entire crust and the uppermost, solid part of the mantle.
27. (c) Slab Pull
28. (c) Sedimentary
29. (b) Ancient, highly metamorphosed rocks
30. (c) Both 1 and 2