

Mid Zoo 503 Solved

1. First Fossil Evidence Of Bipedalism?

The oldest clear evidence for bipedalism: human tracks in volcanic ash from Tanzania, 3.75 Ma. • The oldest substantial skeletons, of *Praeanthropus afarensis*, 3.2 Ma.

2. What Are Biozones In The Context Of Biostratigraphy?

Biozones: The main operational units of a biostratigraphy. Measurements of the stratigraphic ranges of fossils, or assemblages of fossils, form the basis for the definition of biozones. The known range of a zone fossil is the time between its first and last appearances in a specific rock section, • First appearance datum (FAD) • Last appearance datum (LAD). Establishment of biozones • Quantitative techniques to understand the relationships between rock thickness and time, and to make links from locality to locality.

3. What Is Micropaleontology?

Micropaleontology is the branch of paleontology that studies microfossils, or fossils that require the use of a microscope to see the organism, its morphology and its characteristic

4. What Are Helicoplacoids?

Helicoplacus is the earliest well-studied fossil echinoderm. Fossil plates are known from several regions. Complete specimens were found in Lower Cambrian strata of the White Mountains of California. The animal was a cigar-shaped creature up to 7 centimetres long that stood upright on one end.

5. What Are Anatomic Filters?

Organisms are likely to be preserved only if they have hard parts, a skeleton of some kind. • Entirely soft-bodied organisms, such as worms and jellyfish, are only preserved in rare cases.

6. Name The "Big Five" Mass Extinctions Event?

The "big five" Phanerozoic mass extinctions occurred in the • End-Ordovician • Late Devonian • End-Permian • End-Triassic • End-Cretaceous.

7. Write Four Feature Characteristics Of Phylum Mollusks?

Unsegmented soft body with bilateral symmetry.

Presence of an internal or external shell.

A toothed tongue (made mostly of chitin) called the radula.

A mantle which is a fold in the body wall that lines the shell.

Muscular foot (and/or tentacles in some).

(copied from google)

Short Questions (03)

8. Role Of Amateurs?

Amateurs are not paid to work as paleontologists • Collaborations between different sciences is the key.

9. Thermal Maturity?

Helps in identifying the levels of thermal maturity of rocks. {**Thermal maturity** is the extent of heat-driven reactions that alter the composition of organic matter (e.g., conversion of sedimentary organic matter to petroleum or cracking of oil to gas.)}

10. Gaia's Hypothesis?

Gaia hypothesis: Earth as a living organism in equilibrium with its biosphere.

11. Formation of Bed and Member?

A bed, is a lithologically distinct layer within a member or formation and is the smallest recognizable stratigraphic unit. **A member** is a more local lithologic development, usually part of a formation.

12. Isthmus Of Panama?

Barrier for some organisms may provide a corridor for others. • The emergence of the Isthmus of Panama (3 Mya) • Connected North and South America • Separated the Atlantic and Pacific oceans.

13. Types Of Fossils?

Five types of fossils: (a) insect preserved in **amber**, (b) **petrified wood** (**permineralization**), (c) **cast and mold** of a clam shell, (d) pyritized ammonite, and (e) compression fossil of a fern. **(Google)**
Body fossils: the partial or complete remains of plants or animals
Trace fossils: the remains of the activity of ancient organisms, such as burrows and tracks. **(PPT)**

14. Diff scavenging and Decay?

When large animals feed on dead plant or animal tissues, the process is termed **scavenging** • When microbes, such as fungi or bacteria, transform tissues of the dead organism, the process is termed **decay**.

15. Diff Volatile and Refractories?

Soft parts of animals are made from volatiles, forms of carbon that break down readily. • Refractories are the organic carbons much less liable to break down, such as cellulose.

16. Infaunal and Epifaunal?

Infaunal organisms live beneath the sediment–water interface • **Epifaunal** organisms live above it The sediment–water interface

17. Allometry and Isometry?

Allometry is a well-known study, particularly in statistical shape analysis for its theoretical developments, as well as in **biology** for practical applications to the differential growth rates of the parts of a living organism's body.

The word 'allometric' comes from the word for different measure in Greek. Most organisms grow allometrically. We then learned that **isometric** growth is growth in which, the proportions of the organism grow the same. This comes from the Greek word that means same measure. Very few organisms grow isometrically.

18. Endosymbiotic Theory?

Margulis: 1970s. • Prokaryote consumed, or was invaded by, prokaryotes • Two species evolved together in a mutually beneficial way.

Endosymbiotic theory is an evolutionary **theory** that assumes **endosymbiosis** between prokaryotic **endosymbionts** and eukaryotic host cell is the **means** by which organelles such as mitochondria and chloroplasts occur within eukaryotic cells.

19. Insects and Corals?

Insects first appeared during the Early Devonian and diversified rapidly • There are probably 10 million species of living insects. Insects had probably already evolved flight before the Mid Carboniferous, when giant dragonflies patrolled the forests.

Corals Most diverse and most threatened ecosystems • The coral reef • Shallow-water coral reefs in zone extending 30° north and south of equator • 30m or 18 °C.

Long Questions (05)

20. Usefulness of Microfossils Record?

Studying **microfossils** has a lot of **uses**. **Microfossils** are **used to** determine how old a piece of rock is and determine if there is gas or oil in the area. They are also **used to** see what kinds of major geological events took place such as earthquakes or major weather changes such as ice storms.

21. Origin Of Life In Early Precambrian World?

The Precambrian is divided into • Hadean eon • Archaean eon • Proterozoic eon • Hadean Eon spans from the origin of the Earth, 4.57 to about 4 Ga. Beginning of the Hadean • Temperatures on surface were too high • The crust was too unstable for any form of carbonbased life to exist. As the Earth's surface cooled, the lithosphere, its rocky crust, began to differentiate as a cooler upper layer above the underlying asthenosphere. The oldest rocks are from Canada and are dated at 3.8–4 Ga, and some mineral grains from Australia have even been dated to 4.4 Ga Lasted from about 4 to 2.5 Ga. • The oldest sedimentary rocks from the Isua Group in Greenland, dated at 3.8–3.7 Ga. The Proterozoic Eon, from 2.5 Ga to 542 Ma • 2.4 Ga, atm oxygen levels rose to onehundredth or onetenth of modern levels. around 0.8–0.6 Ga is indicated by increased levels of marine sulfate • The two rises in oxygen levels, at the beginning and end of the Proterozoic.

22. Protozoan Characteristics?

Protozoa are notable for their ability to move independently, a **characteristic** found in the majority of species. They usually lack the capability for photosynthesis, although the genus Euglena is renowned for motility as well as photosynthesis (and is therefore considered both an alga and a **protozoan**).

23. Note On Cambrian Explosion?

The Cambrian explosion generated a range of new body plans during a relatively short time interval.

24. Note On Cephalopodes?

A cephalopod is any member of the molluscan class Cephalopoda such as a squid, octopus or nautilus. These exclusively marine animals are characterized by bilateral body symmetry, a prominent head, and a set of arms or tentacles modified from the primitive molluscan foot.

25. Arthropods Features?

However, the members of this phylum, despite their incredible diversity and sheer numbers, share a number of important distinguishing characteristics.

- Exoskeleton. ...
- Segmented Bodies.
- Jointed Appendages.
- Bilateral Symmetry.
- Open Circulatory System.

26. Echinoderm Water vascular System?

The **water vascular system** is a hydraulic **system** used by **echinoderms**, such as sea stars and sea urchins, for locomotion, food and waste transportation, and respiration. The **system** is composed of canals connecting numerous tube feet.

27. Any 2 Models about Origin of Life?

Scientific models: Some of them now rejected by the evidence • Others still available as potentially valid hypotheses: 1. Spontaneous generation 2. Inorganic model. 3. Extraterrestrial origins 4. Biochemical model 5. Hydrothermal model.

The inorganic model: Complex organic molecules arose gradually on a preexisting, nonorganic replication platform • Silicate crystals • Graham Cairns-Smith of Glasgow University, 2007 • not conclusive.
(in ppts have more models)

28. Define Paleontology?

Paleontology. [pā'lē-ŏn-tŏl'ə-jē] The scientific study of life in the geologic past, especially through the study of animal and plant fossils.

29. Define Speciation. Two Forms of Speciation?

Speciation often occurs by the establishment of a barrier, and the isolation of part of a previously interbreeding population. Evolution takes place both within • Species lineages (phyletic gradualism) • at the time of speciation (punctuated equilibrium).

30. Among Polychaetes, Why Paddle Worms Have Complete Record?

Polychaetes: A diverse polychaete fauna has been described from the Burgess Shale • Even contains *Canada spinosa* • Similar to some living polychaetes. **Paddle worms:** most complete fossil record • Record is enhanced by the relatively common preservation of elements of the phosphatic jaw: *scolecodonts*.

31. Island Geography?

Islands are areas of land that are not connected to a continent and are surrounded by water. Small **islands** are sometimes called cays, keys, or islets. A group of **islands** is often called an archipelago. There are two main types of **islands**; continental **islands** and oceanic **islands**.

32. Zones Of Fossil?

Index **fossils** (also known as guide **fossils** or indicator **fossils**) are **fossils** used to **define** and identify geologic periods (or faunal stages). Index **fossils** must have a short vertical range, wide geographic distribution and rapid evolutionary trends. (Google)

33. Bangiomorpha?

Bangiomorpha pubescens is a red alga. It is the first known sexually reproducing organism. A multicellular fossil of **Bangiomorpha pubescens** was recovered from the Hunting Formation in Somerset Island, Canada that strongly resembles the modern red alga *Bangia* despite occurring in rocks dating to 1,047 million years ago.

34. Oldest Rocks and Their Age?

The oldest rocks are from Canada and are dated at 3.8–4 Ga, and some mineral grains from Australia have even been dated to 4.4 Ga.

35. Nanoplankton?

Like other phytoplankton, **nanophytoplankton** are microscopic organisms that obtain energy through the process of photosynthesis and must therefore live in the upper sunlit layer of ocean or other bodies of water. ... The term **nanophytoplankton** is derived from the far more widely used term **nannoplankton/nanoplankton**.

36. Sexual Dimorphism?

Sexual dimorphism is the condition where the two sexes of the same species exhibit different characteristics beyond the differences in their **sexual** organs. The condition occurs in many animals and some plants.

37. Deuterostomes?

Deuterostomia is a subtaxon of the Bilateria branch of the subkingdom Eumetazoa, within Animalia, and are distinguished from protostomes by their deuterostomic embryonic development; in **deuterostomes**, the first opening (the blastopore) becomes the anus, while in protostomes, it becomes the mouth.

38. Trilobitomorpha?

Highly derived arthropods • lack specialized mouthparts • Tagmata comprising the cephalon, thorax and pygidium • Trilobitomorph appendages. Mainly the trilobites and over 15,000 species are known • Common: throughout the Paleozoic • Extinction: end of the Permian.

39. Island Biogeography?

Insular **biogeography** or **island biogeography** is a field within **biogeography** that examines the factors that affect the species richness of isolated natural communities. The theory was originally developed to explain species richness of actual **islands**, principally oceanic.

40. What Are Plesiomorphies?

In phylogenetics, a **plesiomorphy**, sympleisiomorphy or sympleisiomorphic character is an ancestral character (trait state) shared by two or more taxa - but also with other taxa linked earlier in the clade (that is, having an earlier last common ancestor, with them, than theirs).

41. Biostratigraphy?

The branch of stratigraphy concerned with fossils and their use in dating rock formations.

42. Biozones Range?

Biostratigraphic unit or **biozones** are intervals of geological strata that are **defined** on the basis of their characteristic fossil taxa. ... The International Commission on Stratigraphy defines the following types of **Biozones**: **Range** zones, subdivided into taxon-**range** zones and concurrent-**range** zones.

43. Triploblastic Body Plan?

Few basic body plans have appeared in the fossil record • most animals have triploblastic architecture • Three fundamental body layers.

44. Oldest fossil in their ages?

The oldest eukaryote fossil may be Grypania, • A coiled, spaghetti-like organism that has been reported from rocks as old as 1.85 Ga

The oldest locomotory trace fossils are from about 550 Ma northwest Russia • Fecal strings from rocks some 600 Ma suggesting Bacteria in rocks up to 3.2 Ga, indicated by stromatolites.

45. Write the name of animal groups who hits by end permian mass extinction event?

The end-Permian mass extinction was the largest of all time • Probably caused massive volcanic eruptions, leading to acid rain and global anoxia. (ppts)

During the period a number of animal groups became extinct, including the trilobites, tabulate and rugose corals, and blastoids (see mass extinction). **Amphibians** and **reptiles** continued to be the dominant land animals and gymnosperms replaced ferns, clubmosses, and horsetails as the dominant **plants**. "Permian. (google)

46. What are the Trilobitomorpha? what are their different body parts? 3

Highly derived arthropods

- lack specialized mouthparts
- Tagmata comprising the cephalon, thorax and pygidium
- Trilobitomorph appendages

Mainly the trilobites and over 15,000 species are known

- Common: throughout the Paleozoic
- Extinction: end of the Permian

47. What is "Great Ordovician Biodiversification Event" (GOBE)?

Great Ordovician biodiversification event (GOBE), • Evolutionary radiation of animal life during the Ordovician Period, 40 my after the CE. Followed a series of Cambrian– Ordovician Extinction events •

Fauna went on to dominate the Palaeozoic • Marine diversity increased Ordovician diversification generated witnessed a staggering increase in biodiversity at the family, genus and species levels.

Important Definitions (02)

Burgess Shale: The Burgess Shale is a fossil-bearing deposit exposed in the Canadian Rockies of British Columbia, Canada. It is famous for the exceptional preservation of the soft parts of its fossils. At 508 million years old, it is one of the earliest fossil beds containing soft-part imprints

Lagerstätten: A Lagerstätte (German: ['la:gə'tɛtə], from Lager 'storage, lair' Stätte 'place'; plural **Lagerstätten**) is a sedimentary deposit that exhibits extraordinary fossils with exceptional preservation—sometimes including preserved soft tissues.

Lithostratigraphy: **Lithostratigraphy** is a sub-discipline of stratigraphy, the geological science associated with the study of strata or rock layers. Major focuses include geochronology, comparative geology, and petrology. In general a stratum will be primarily igneous or sedimentary relating to how the rock was formed.

Signor-Lipps Effect: The **Signor–Lipps effect** is a paleontological principle proposed by Philip W. **Signor** and Jere H. **Lipps** which states that, since the fossil record of organisms is never complete, neither the first nor the last organism in a given taxon will be recorded as a fossil.

Chronostratigraphy: **Chronostratigraphy** is the branch of stratigraphy that studies the age of rock strata in relation to time. The ultimate aim of **chronostratigraphy** is to arrange the sequence of deposition and the time of deposition of all rocks within a geological region, and eventually, the entire geologic record of the Earth.

Taphonomy: Taphonomy is the study of how organisms decay and become fossilized.

Coenosis: An ecosystem, originally defined by Tansley (1935), is a biotic community (or biocenosis) along with its physical environment (or biotope). In ecological studies, biocenosis is the emphasis on relationships between species in an area.

Variation and Speciation: **Variation**, in **biology**, any difference between cells, individual organisms, or groups of organisms of any species caused either by genetic differences (**genotypic variation**) or by the effect of environmental factors on the expression of the genetic potentials (**phenotypic variation**).

Speciation is the evolutionary process by which populations evolve to become distinct species. ... There are four geographic modes of **speciation** in nature, based on the extent to which speciating populations are isolated from one another: allopatric, peripatric, parapatric, and sympatric.

Cladistics: **Cladistics** is an approach to biological classification in which organisms are categorized in groups based on the most recent common ancestor.

Fidelity: The **fidelity** of a DNA polymerase is the result of accurate replication of a desired template. ... High-**fidelity** PCR utilizes DNA polymerases that couple low misincorporation rates with proofreading activity to give faithful replication of the target DNA of interest.