

Benha University
Faculty of Science
Geology Department
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Biostratigraphy (210)
Final Ex. (24 marks)
Time One Hour
2nd year Geology & Chm.

Answer of Biostratigraphy (210 G)

I- Write in the following:

(8marks)

a- Problems in biostratigraphy.

- Many kinds of fossils are facies-controlled
- Some kinds of fossils are very long-ranged.
- Such good zonal fossils as the graptolites are delicate and only preserved in quiet environments, being destroyed by more turbulent conditions.
- Reworked fossils
- Introduced or infiltrated fossils
- Overlaps and Gaps between units
- Effects of stratigraphic condensation

a- TRZ, PRZ, and AZ.

The Total Range Zone (TRZ): A body of strata representing the total range of occurrence (Horizontal and Vertical) of a particular taxon.

The taxon range zone is particularly valuable as an indicator of geologic age because of the limited time range.

It may be as global in extent.

Boundaries: The boundaries of a taxon range zone are surfaces

(biohorizons) marking the outermost limits of known occurrence (i.e.

The limits are those of the origin and the extinction; FO or FAD to LO or LAD) of the assemblage characteristic of the unit.

The boundaries of a taxon range zone are continually subject to change with new discoveries.

Name: The name of a taxon range is named from the taxon whose range expresses.

The assemblage zone (AZ): A body of strata characterized by a distinctive natural assemblage or association that distinguishes it in biostratigraphic characters from adjacent strata.

Assemblage zone are usually linked in practice to local areas or regions as they are closely linked with life environments that vary greatly geographically.

The assemblage zone is particularly significant as an indicator for environment.

Boundaries: Assemblage zone boundaries are drawn at surfaces (biohorizons) marking the limits of occurrence of the assemblage characteristic of the unit.

Name: The name of an assemblage zone should preferably be derived from two or more of the prominent and diagnostic constituents of the fossil assemblage.

c- Lower Cretaceous ammonite biozones.

- 8- *Mortoniceras inflatum* Zone (Late Albian)
- 7- *Knemiceras gracile* Zone (Early Albian)
- 6- *Acanthohoplites nolani* Zone (Late Aptian)
- 5- *Epicheloniceras tschernyschewi* Zone (late Middle Aptian)
- 4- *Aconeceras nisus* (early Middle Aptian)
- 3- *Deshayesites deshayesi* Zone (Early Aptian)
- 2- *Barremites difficilis* Zone (Late Barremian)
- 1- *Subpulchellia oehlerti* Zone (Late Barremian)

d- Paleogene planktic foraminiferal biozones.

- 1- *Parvularugoglobigerina eugubina* TR Z (Earliest Paleocene)
- 2- *Morozovella pseudobulloides* IZ (Early Paleocene)
- 3- *Morozovella trinidadensis* IZ (late Early Paleocene)
- 4- *Morozovella uncinata* IZ (Middle Paleocene)
- 5- *Morozovella angulata* TRZ (Middle Paleocene)
- 6- *Planorotalites pusilla pusilla* IZ (late Middle Paleocene)
- 7- *Planorotalites pseudomenardii* IZ (Late Paleocene)
- 8- *Morozovella velascoensis* IZ (Latest Paleocene)
- 9- *Morozovella edgari* IZ (Earliest Eocene)
- 10- *Morozovella subbotinae* IZ (Early Eocene)

11- *Morozovella formosa formosa* TRZ (Early Eocene)

12- *Globorotalia opima* TRZ (Late Oligocene)

II- Complete the following:

(2 marks)

a – The Germanian Triassic facies is subdivided into

Buntsandstein, Muschelkalk, and Keuper

b- Among the extinct marine invertebrates at the end of the

Mesozoic Era are **ammonites, beminites, rudists, inoceramids.**

III- Correct the following sentences:

(6 marks)

a- In Egypt, the Cretaceous sediments are rich with **Orbitolina**

while, the Eocene sediments are characterized by the genus

Nummulites .

b- The graptolites are nearly limited to **the Early Paleozoic.**

c- The rudists are firstly appeared nearly at the Middle of

the Mesozoic Era.

d- The **ammonites** are considered good index fossils for the

Mesozoic Era.

IV- Choose the correct answer(s):

(2 marks)

a- One of the following is not belong to the chronostratigraphical

units (Stage, **Period**, Erathem).

- b- One of the following is belong to the Lower Cretaceous Stages (Cenomanian, Aptian, Campanian).
- c- The genus *Nummulites* is considered among the diagnostic foraminiferal genera for the(Carboniferous, Cretaceous, Eocene).
- d- Archaeocyathids are limited to the (Cambrian, Aptian, Albian).

V- Compare between the following: _____ (6 marks)

a- Paleozoic and Cenozoic zonal fossils.

Paleozoic zonal fossils

Trilobites, Graptolites,
Coccolithophores
and Goniatites

Cenozoic zonal fossils

Planktic foraminifera,
and Diatoms

b- Solnhofen Limestone and Burgas Shale.

Solnhofen limestones are those rare fossil occurrences of soft-bodied animals which are rarely preserved in the geologic record.

Near **Solnhofen-Eichstatt area (Southern Germany)**, there are **deposits of very fine-grained limestone (Solnhofen limestone)** was deposited in quiet broad lagoon in the Late Jurassic.

This limestone contains fishes, jellyfish, insects, pterosaurs, birds, and many other forms.

The body outlines showing jellyfish tentacles, insect wings, pterosaur wing membranes, and the feather of the oldest birds are preserved as impressions. A similar deposits were found recently in the U. S. S. R.

Burgas Shale. Rich fossil beds in British Columbia

Shale has small clay-sized grains, which means the area was low-energy - less destruction of dead organisms, even soft ones

Organic rich means the area where the organisms landed was anoxic - reduces decay and breakdown of dead organisms

The Burgess organisms represented a number of forms not seen before or since.

c- Chronostratigraphical and Geochronological units

Chronostratigraphical units

Geochronological units

(Time-Rock Unit)

- **Eonothem**
- **Erathem**
- **System**
- **Series**
- **Stage**

(Time Unit)

- Eon**
- Era**
- Period**
- Epoch**
- Age**

d- Paleozoic and Mesozoic marine invertebrates.

Paleozoic marine invertebrates

Trilobites, Graptolites, Brachiopodes, Corals, The extinct Archaeocyaths (Sponge-like animals which are limited to the cambrian). Molluscs (Nautiloids, Gastropods, Bivalves), Crinoids, Fusulines, Ostracods, Conodonts

Mesozoic marine invertebrates.

Corals, Sponge, Bryozoans, Crinoides, and Brachiopodes are generally rare in the Mesozoic rocks.

However, Mollusks became the most important invertebrates of the Mesozoic seas

This include;

Bivalves (Rudists, Inoceramids, Oysters), Gastropods, and Cephalopods (Ammonites, Belemnites)

In addition to the Foraminifera and Ostracods.