



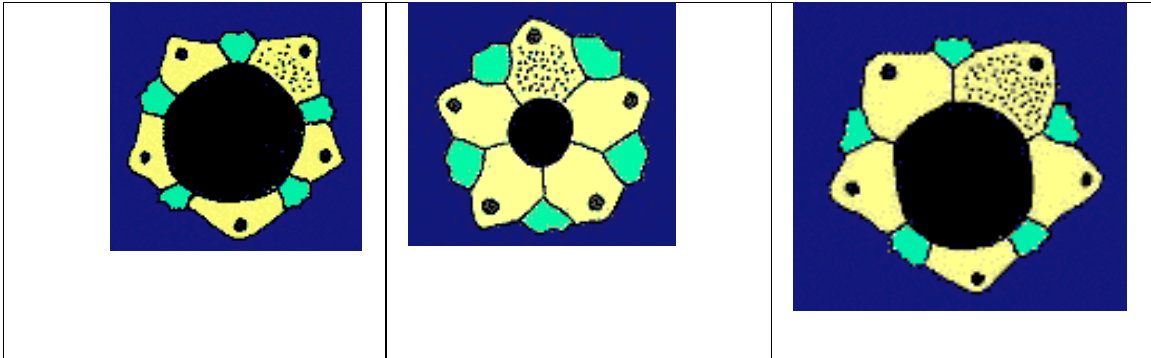
**Benha University**  
**Faculty of Science**  
**Geology Department**  
**2<sup>nd</sup> year Geology**

**Invertebrate Paleont. (215)**  
**Final Ex. (48 marks)**  
**Time Two Hours**  
**Date: 9-1-2019**

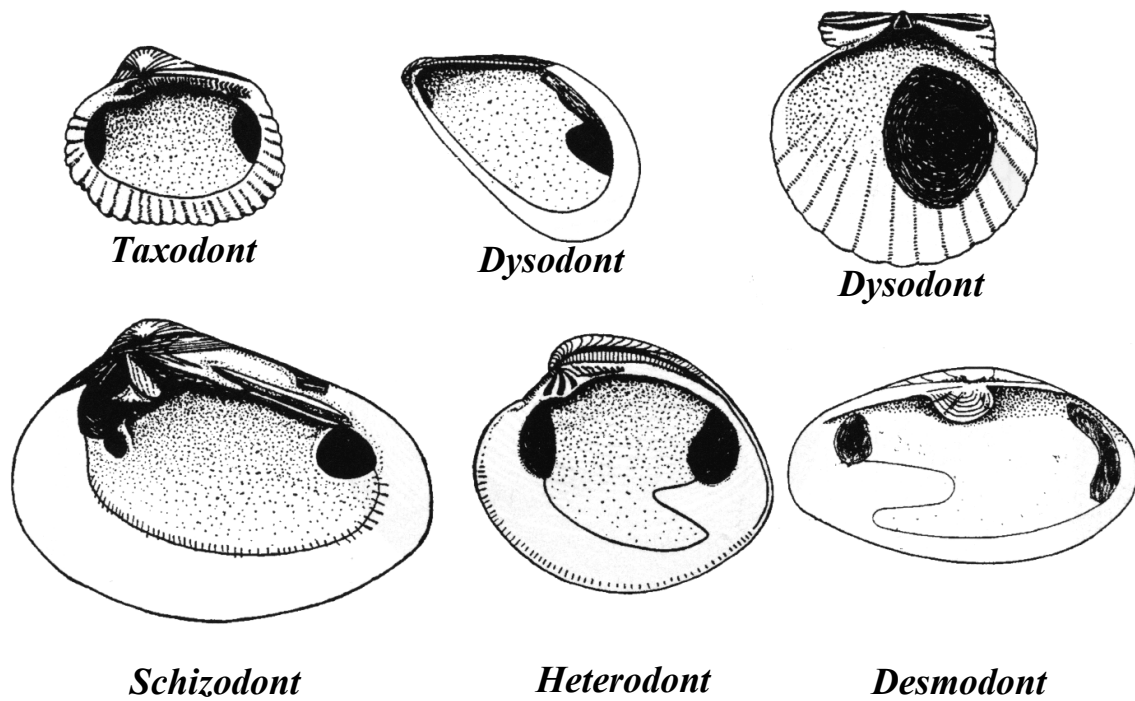
***Answer of Invertebrate Paleontology***

**I- Write on the following (with drawing):** (15 marks)

**a- Types of echinoid plates in regular echinoids**



**b- Dentition of bivalves.**

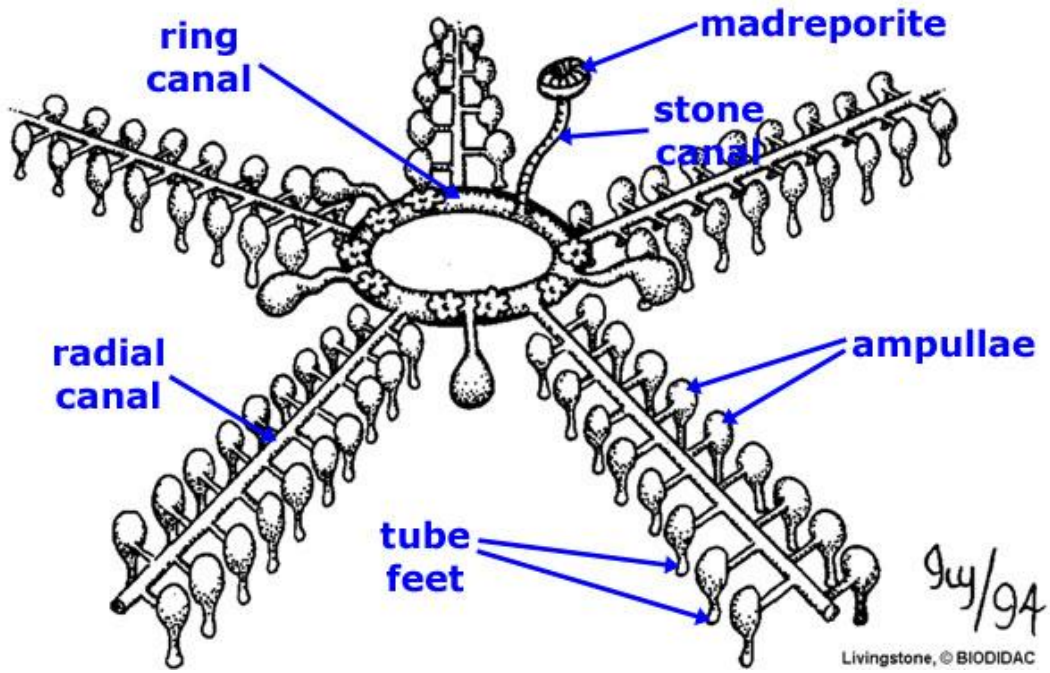


**c- Evolution of the ammonoid primary sutures.**

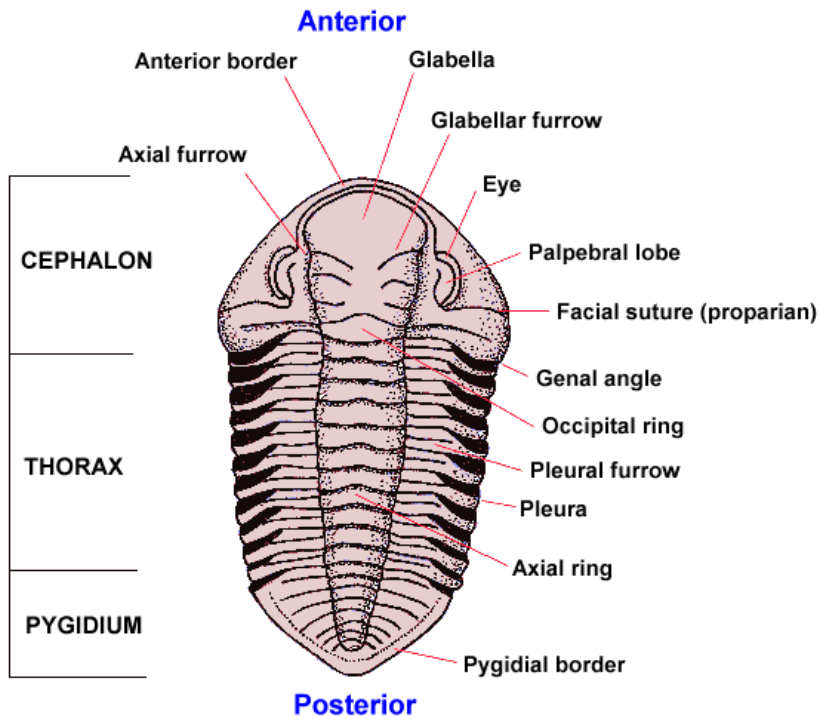
- Three lobed; Goniatites
- Four lobed; Ceratites and heteromorph ammonites
- Five lobed; Jurassic-Cretaceous ammonites
- six lobed; Tetragonitids (group of Cretaceous ammonites)

	three-lobed	four-lobed	five-lobed	six-lobed
Cretaceous		heteromorphs		tetragonitids
Jurassic			ammonites	
Triassic		ceratites		
Permian-Triassic	goniatites			

d- Water vascular system



e- Trilobites shell morphology.



**II- Complete the following:**

**(10 marks)**

- a- According to the arrangement of the oculogenital ring, the apical disc of regular echinoids is described as **Monocyclic** or **dicyclic** or **Hemicyclic**
- b- The cnidaria are classified into Hydrozoa, Scyphozoa, Anthozoa, Cubozoa.
- c- Lophophorates include the following Phoronida, Brachiopoda, and Ectoprocta ( Bryozoa)
- d- Sponges are subdivided into the following classes Demospongea, Hexactinellida (Hyalospongea), Calcarea (Calcispongea), and Sclerospongea
- e- The belemnite shell is composed of **calcite** while the ammonite shell is composed of **aragonite**

**III- Choose the correct answer or answers:**

**(5 marks)**

- a- The archaeocyathids were extinct before (250 M.Y., 65 M. Y., **500 M. Y.**) ago.
- b- The suture that separates between ambulacrum and interambulacrum in the echinoid test is called (radial, interradial, **adradial**).
- c- The inoceramids are firstly appeared nearly at the Middle of the (**Mesozoic Era**, Paleozoic Era, Cenozoic Era).
- d- The bivalves are characterized by the absence of (foot, **radula**, **head**).

e- The graptolites extinct nearly at the Middle of the (Cenozoic Era, Mesozoic Era, **Paleozoic Era**)

**IV- Correct the following sentences:** (6 marks)

- a- The **ammonites** are firstly appeared in the Devonian or
- b- The rudists are firstly appeared in the **Jurassic**.
- c- In each theca there once lived a separate graptolite animal, referred to as **zooid**.
- d- Articulate brachiopods are characterized by having an **calcitic shell**.
- e- The presence of gill-notches are considered a diagnostic feature **for most regular echinoids and some irregular** .

**V- Compare between the following:** (12 marks)

a- Brachiopods and bivalves.

<b>Bivalves</b>	<b>Brachiopods</b>
Left & Wright	Dorsal & Ventral
Teeth & sockets in the Same valve	teeth in pedicle valve & sockets in brachial
The plane of symmetry between the two valves	through the two valves
No Pedicle	With Pedicle

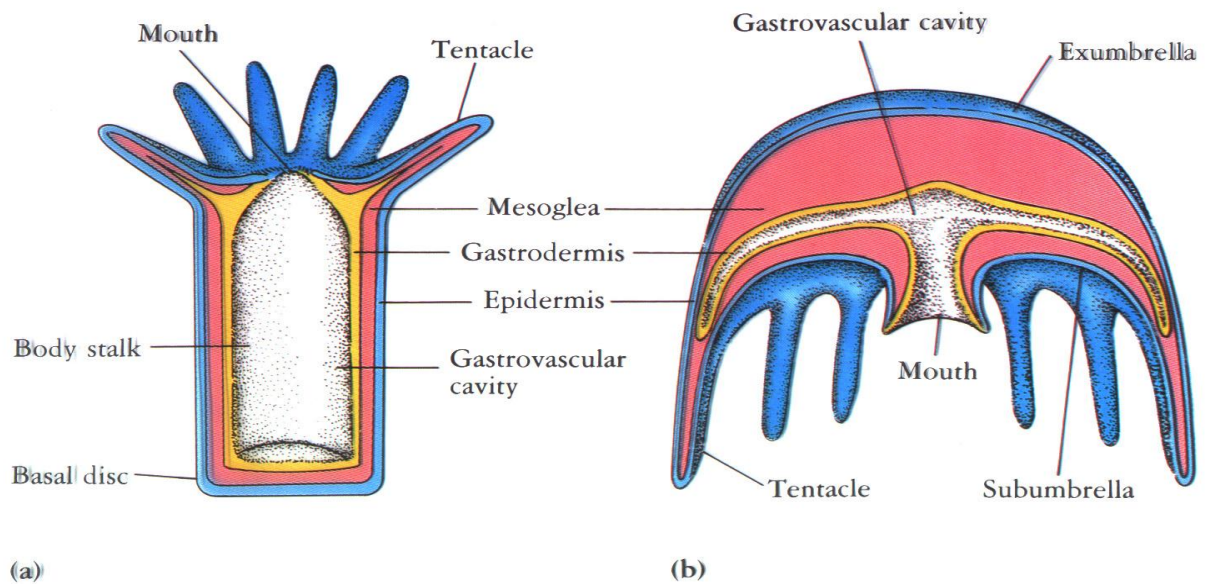
## b- Polyp and medusa

### Polyp form:

- Tubular body, with the mouth directed upward.
- Around the mouth are a whorl of feeding tentacles.
- Only have a small amount of mesoglea
- Sessile

### Medusa form:

- Bell-shaped or umbrella shaped body, with the mouth is directed downward.
- Small tentacles, directed downward.
- Possess a large amount of mesoglea
- Mobile, move by weak contractions of body

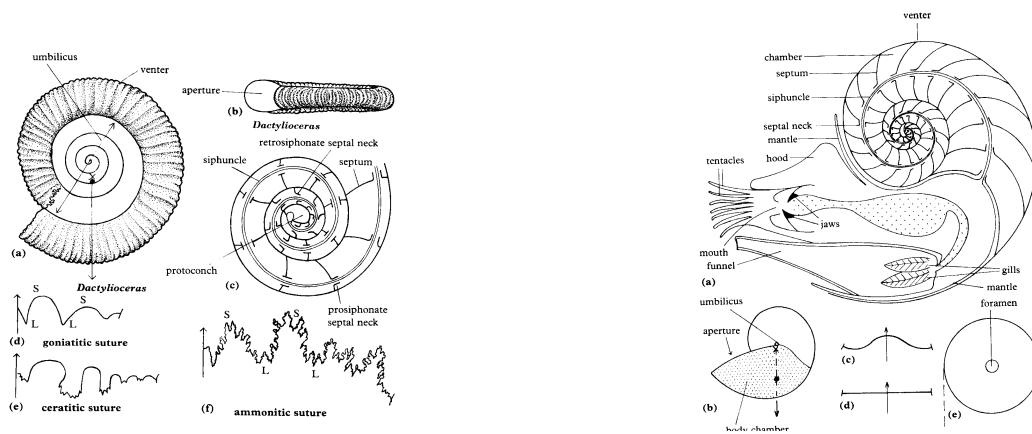


## c- Ammonoid and nautiloid shell morphology:

**Ammonites**

**Nautiloids**

- More complex suture line as they evolved.      Simple suture line.
- Siphuncle starts central and then moves to the outer edge (venter).      Siphuncle is central.
- Septal neck starts retrosiphonate,      Septal necks retrosiphonate becomes both and then prosiphonate.
- Last chamber small.      Last chamber large.
- More ornamentation as they evolved.      Smooth shell



### d- Regular and irregular echinoids

<b>Regular</b>	<b>Irregular</b>
<b>Symetry:</b> pentaradial	bilateral
<b>Mouth:</b> Central	central or anterior
<b>Anus:</b> endocyclic	exocyclic
<b>Ambulacra:</b> simple (non-petalloid)	simple to petalloid

**Mode of life:** epifaunal

infaunal to semi infaunal

**Substrate:** hard substrate

soft sediments

**Prof. Gamal El Qot**