Locomotion and Reproduction in Protozoans

Very Short Answer Questions:

1. Draw a neat labelled diagram of T.S. of flagellum?



2. What are dynein arms? What is their significance?

- Dynein arms are the paired arms formed from the 'A' tubule of each peripheral doublet in a flagellum/cilium.
- Dynein arms are protein motor molecules.
- Dynein arms are the sites of ATPase activity in the cilia and flagella.

3. What is a kinety?

- Kinetosomes are present at the bases of cilia. Kinetodesmal fibrils are connected to the kinetosomes and run along the right side of each row of kinetosomes as a cord of fibres known as kinetodesmata.
- A longitudinal row of kinetosomes together with kinetodesmata constitue a unit known as kinety.

4. Distinguish between synchronous and metachronous movements?

- Cilia in Paramecium show two types of coordinated movements.
 - i) Synchronous Movement: cilia in a transverse row beat simultaneously in one direction.
 - ii) Metachronous Movement: cilia of longitudinal row show sequential movement one after

the other in one direction. It passes like a wave.

5. Distinguish between Proter and Opisthae?

- Proter and opisthae are the two daughter individuals formed from Paramecium after transverse binary fission.
- Proter is the anterior daughter and opisthae is the posterior daughter.
- Proter gets cytopharynx, anterior contractile vacuole, cytostome from parent. It develops posterior contractile vacuole and a new oral groove.
- Opisthae receives the posterior contractile vacuole from parent. It develops a new anterior contractile vacuole, cytopharynx, cytostome and a new oral groove.

6. Distinguish between lobopodium and filopodium. Give an example to each of them?

- Lobopodium and filopodium are the types of pseudopodia in protozoans.
- Lobopodium is blunt finger like pseudopodium... Eg., Amoeba, Entamoeba
- Filopodium is a fibre like pseudopodium..., Eg., Euglypha

7. Define conjugation with reference to ciliates. Give two examples?

- Wichterman defined conjugation as temporary union between two senile ciliates that belong to different mating types for the exchange of nuclear material and its reorganization.
- It occurs in ciliates like Paramecium and Vorticella.

Short Answer Questions

- 1. Describe the process of transverse binary fission in Paramecium?
- Transverse binary fission is shown by Paramecium. It has polyploid macronucleus and diploid micronucleus. It has an oral grove, cytostome and ctyopharynx in oral surface.
- During favorable conditions, Paramecium undergoes binary fission in the following manner.
 It stops feeding and gets maximum growth.
 - ✤ Oral groove disappears.
 - ♦ Macronucleus divides by amitosis and micronucleus divides by mitosis.
 - A transverse constriction appears in the middle of the body which deepens and divides the parent cell into two daughter individuals, the anterior Proter and posterior Opisthe.
 - Both daughters get some organelles from parent and remaining formed newly in the following manner.

Daughter	Organelles retained from parent	Organelles formed newly	
1.Proter	Cytostome, cytopharnyx,	Oral groove, posterior	
	anterior contractile vacuole, nuclei	contractile vacuole	
2.Opisthe	Posterior contractive vacuole,	Oral groove, anterior	
•	nuclei	contractile vacuole,	
		cytostome, cytopharynx	

- Binary fission is completed in almost two hours, and Paramecium can produce four generations of daughters in a day.
- Transverse binary fission is considered as homothetogenic fission as the plane of fission is at right angles to the longitudinal axis of the body.
- * As the plane of fission is right angles to the kineties, it is known as Perkinetal fission.

www.sakshieducation.com



www.sakshieducation.com

www.sakshieducation.com

2. Draw a neat labeled diagram of Euglena?



3. Draw a neat labeled diagram of Paramecium?



www.sakshieducation.com

4. Give an account of ultra structure of an axoneme?

- Axoneme is the central longitudinal microtubular structure of a flagellum or cilium. It is surrounded by a membrane.
- An axoneme is made with 2 central singlets and 9 peripheral doublets. They are formed by protein tubulin.
- Each peripheral doublet consists of an outer 'A' tubule and inner 'B' tubule.
- Peripheral doublets are joined by linkers known as nexins.
- * 'A' tubule of each doublet bears paired arms known as dynein arms. These are protein motor molecules.
- ♦ Central singlets are enclosed by a fibrous inner sheath.
- Elastic fibres known as radial spokes connect the inner sheath with 'A' tubule of doublet.



Ultrastructure of Cilia and Flagella

5. Describe the process of longitudinal binary fission in Euglena?

- ✤ Longitudinal binary fission is shown by flagellates like Euglena, Trypanosoma etc.
- * During favourable conditions, euglena undergoes binary fission.
- Nucleus divides by mitosis into two daughter nuclei.
- ✤ A longitudinal groove develops in the middle of the anterior end. It deepens and extends gradually towards the posterior end and divides the organism into two daughter individuals.
- Longitudinal binary fission is known as 'symmetrogenic division' as the two daughter euglenae resemble each other like mirror images.

www.sakshieducation.com

During binary fission, various organelles distribute to both daughters in the following three methods.

a) Some organelles divide and distribute equally to both daughters.. Nucleus, kientosomes and chromatophres.

b) Some organelles of parent are retained by one daughter. Other gets new... Flagella.

c) Some organelles disappear during binary fission.. Formed newly in both ...

contractile vacuoles, stigma, paraflagellar body.



6. Name the system that controls the fastest swimming movement of protozoans and write the components?

- Neuromotor system controls and coordinates the ciliary movement in ciliates which is considered as the fastest movement among protozoans.
- ✤ It is formed by the following components.
- ✤ Kintesomes are present at the bases of cilia.
- Kinetodesmal fibrils are connected to the kinetosomes and run along the right side f each row of kinetosomes as a cord of fibres known as kinetodesmata.

www.sakshieducation.com

- A longitudinal row of kinetosomes together with kinetodesmata constitute a unit called 'Kinety'.
- All the kineties together form an infraciliary system. It is connected to a Motorium present near the cytopharynx.
- Infraciliary system and motorium form the neuromotor system. It controls and coordinates the movement of cilia.



7. What are lateral appendages? Based on their presence and absence, writge the various types of flagella giving at least one example for each type?

- Lateral appendages are lateral hair like fibrils present in one or two or many rows present on flagella. They are also known as mastigonemes.
- Five types of flagella are present based on the presence or absence of mastigonemes. They are

S.No	Type of flagellum	Number of rows	Naked Terminal	Examples.
		Mastigonemes	Filament	
1.	Stichonematic	One row	Absent	Euglena, Astasia
2.	Pantonematic	Two or more	Absent	Peranema, Monas
3.	Acronematic	Absent	Present	Chlamydomonas, Polytoma
4.	Pantacronematc	Two or more	Present	Urceolus
5.	Anematic/simple	Absent	Absent	Chilomonas, Cryptomonas