

SHRI SWAMI VIVEKANAND SHIKSHAN SANSATHA, KOLHAPUR
Vivekanand College, Kolhapur (Autonomous)
Home Assignment -2019-20 (B.Sc.-II) Semester-IV

Index

Sr. No.	Title	Page No.
1	Notice	1
2	Attendance	2 - 4
3	Marksheet	5 - 7
4	Sample copy	8 - 16



Shri. Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)
Department of Zoology
Academic year 2019-20

Date – 13/02/2020

NOTICE

All students of B.Sc. II hereby informed that , submit Home Assignment for Continuous Internal Evaluation (CIE) of B.Sc. II Semester IV up to 22/02/2020 at Zoology Department (Lab.49). The question for home Assignment is given bellow. Submission is mandatory to all.

Q. 1. Select correct alternative and rewrite the sentence **8M**

- 1) is power house of eukaryotic cell.
a) Mitochondria b) lysosome c) Ribosome d) Golgi bodies
- 2) is known as father of genetics
a) Lamark's b) Aristotle c) Mendel d) Charles Darwin
- 3) Lamark's theory of evolution is known as
a) Synthetic theory b) Natural Selection
c) Inheritance of acquired character d) use and disuse
- 4) Industrial melanism is an example of
a) Mutation b) Natural Selection
c) Neo Darwinism d) Neo Lamarckism

Q.2. Long Answer (Attempt any One) **8M**

- 1) Explain in brief Jurassic period and Triassic period.
- 2) Explain ultrastructure and function of mitochondria

Q.3. short note (Attempt any One) **4M**

- 1) Homologous and Analogous organ
- 2) Crossing over



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Sr No.	Roll No.	Name of the Student	Attendance
1.	7501	BARADE ASHWINI BAJIRAO	P
2.	7502	BIRANJE SONALI UTTAM	P
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Nikita Dilip More [7672] Bsc II

18
20

" ज्ञान, विज्ञान आणि सुरांरकार यांसाठी शिक्षण प्रसार "

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Signature of Supervisor



Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE (Autonomous), KOLHAPUR

Class Bsc II Div B Roll No. 72 7672

Suppliment No. _____ Subject Zoology

Test / Tutorial No. Zoology Assignment.

Q 7) Select the correct alternative :

1) Mitochondria is the powerhouse of eukaryotic cell.

2) Mendel is known as father of genetics.

3) Lamarck's theory of evolution is known as Inheritance of acquired characters.

4) Industrial melanism is example of Natural selection.

OB Long question :

B. Explain ultra-structure & Function of mitochondria

The ultrastructure of the mitochondria have been studied under electron microscope.

A typical mitochondria is about 15,000 Å long & 5000 Å in diameter. It is bounded by two unit membranes, namely an outer & inner mitochondrial membrane. Each membrane is about 60 Å in thickness. Two membranes are separated by a space of about 60 Å to 80 Å. The space between the outer & inner mitochondrial membrane is called outer-chamber or inner-membrane space. This space is

This space is filled with a watery fluid of low viscosity & density & it is rich in coenzymes. The central space of the mitochondria which is bounded by the inner chamber is called the inner chamber or inner membrane space. The inner chamber is filled with mitochondrial matrix which contains filamentous material or dense granules, ribosomes and mitochondrial DNA. These granules consist of insoluble inorganic salts & are considered to be the binding sites of divalent ions like Mg^{++} & Ca^{++} .

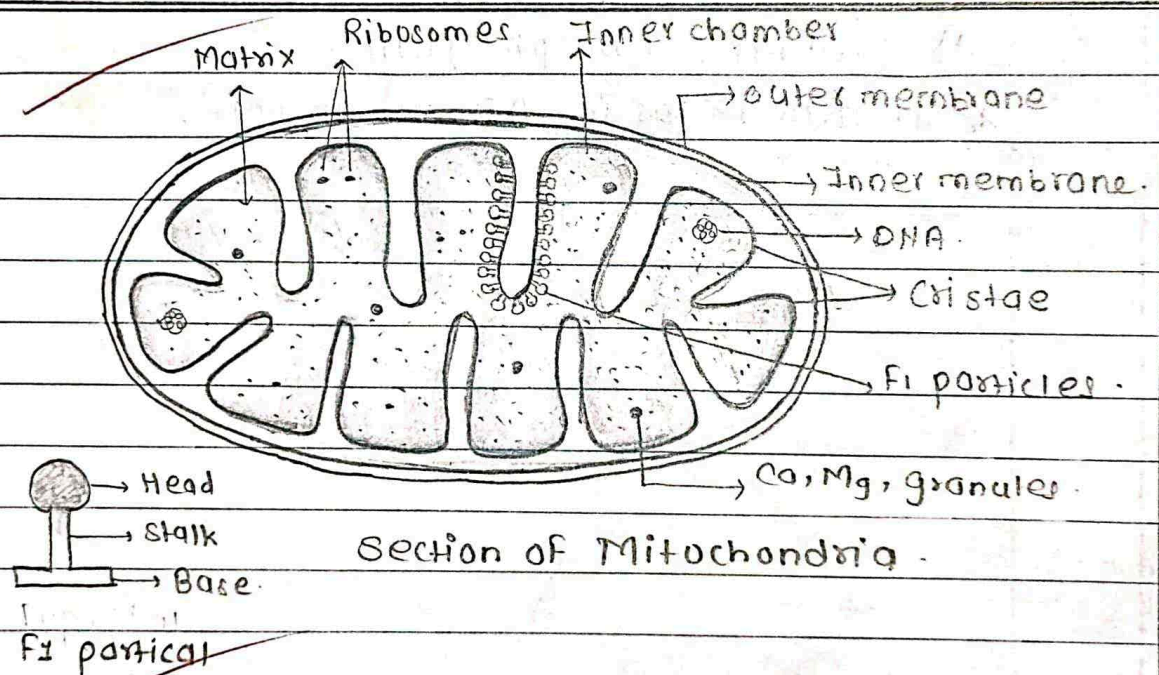
The inner mitochondrial membrane gives out certain finger like projections into the inner chamber, known as cristae mitochondriales. The cavity of the cristae is called the intercristae space. It is found to continue with the intermembrane space.

The electron microscope has revealed the presence of thousand of very small particles which are adhered to the outer surface of the outer membrane & inner surface of the inner membrane.

The particles of the inner membrane are stalked, called the subunits of Fernandez Moran. These particles are also called elementary particles or F₁ particles or oxysomes or electron transport particles (ETP). The particles of the outer membrane are stalkless, called the subunits of Parson.

Recently, it is to be considered that only the stalked particles of the inner membrane are involved in hydrogen transport. Each stalked particle consist of a base piece, a stalk and a

head piece. These particles are placed at a regular interval of about 100 \AA distances. The base which is attached to the inner membrane has about 80 \AA diameter, whereas the head has the same diameter as does the base. The stalk has a length of about 50 \AA , while the length of the entire particle measure about 160 \AA . It's outer membrane particles previously were considered to be hollow cylinder, the length of about 60 \AA , the width of about 60 \AA & the diameter of central hole is about 20 \AA . These particles were thought to contain the enzymes of kreb's cycle.



functions :

- 1) The main function of mitochondria is the synthesis of energy rich compound called ATP.
- 2) The energy released during the oxidation of food stuffs is used for the synthesis of ATP by mitochondria.
- 3) They help in cellular level of transpiration.

It takes place in four steps :

a) Glycolysis - The process of the breakdown of glucose to pyruvic acid is called glycolysis. It occurs inside the cytoplasm & outside the mitochondria.

b) Oxidation & Decarboxylation of pyruvic acid - The pyruvic acid produced in glycolysis enters elementary particles located on outer membrane of mitochondria. These particles contain enzymes which breaks pyruvic acid undergoing oxidation & decarboxylation converted into acetyl co-enzyme.

c) Krebs cycle - Krebs cycle is functional only in aerobic condition. The enzymes for the krebs cycle are located in the matrix of the mitochondria.

d) Oxidative Phosphorylation :

It also helps in ATP & transport.



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- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Signature of
Supervisor

[Signature box]

Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE (Autonomous), KOLHAPUR

Class BSC II Div B Roll No. 7672
Suppliment No. _____ Subject Zoology
Test / Tutorial No. Assignment

Q 2 (Short Note :

B. Homologous and Analogous organs.

Ans →

Homologous organs :

Homologous organs are defined as the organs of different animals that are having a similar structure but differ in their functions

Examples of Homologous organs are the forelimbs of frog, man & flippers of the whale. The structure of these animals are the same but the functions are different.

Flippers are used for swimming, the forelimbs of frog are used for jumping & forelimbs of man used for writing, eating, holding things, etc.

In biology, homology is similarity due to shared ancestry between pair of structures or genes in different taxa.

Evolutionary biology explains homologous structures adapted to different purposes as of descent with modification from common ancestor. Homology shows divergent evolution from common ancestor.

Analogous organs :

Analogous organs are defined as the organs of different animals that are having different structure but perform the same function.

Examples of Analogous organs are the wings of insect & wings of the birds. The structure of wings of birds covered with flesh, skin & feathers whereas the wing of insect is an extension of integument. But in both the cases, wings are used for flying.

These organisms would have to adapt to the same ecological niche as other organism.

Hence, they may have evolved similar organ.

Analogy shows convergent evolution from different ancestor.



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Class B.Sc - 1st Div B Roll No. 7546
Suppliment No. _____ Subject Zoology
Test / Tutorial No. Assignment

Q. 1. Multiple choice questions :

1. Mitochondria is the powerhouse of eukaryotic cell.
2. Mendel is known as father of genetics.
3. Lamarck's theory of evolution is known as Inheritance of acquired characters.
4. Industrial mechanism is example of Natural selection.

Q. 2. Long Question (any one)

1. Explain the structure and function of mitochondria.
Introduction

The mitochondria (Greek mitos = filament ; chondrias granule) are small, granular and filamentous bodies found in the cytoplasm of the cells.

They are found in all aerobically respicing cells of plants and animals but not in bacteria. They contain enzyme and coenzymes which are responsible for energy metabolism.

The mitochondria were first observed by Kolliker in 1850 and later by Flemming 1882. The

The organelles were firstly named as bioplasts by Allman 1892 later the term mitochondria was introduced by Benda in 1898.

Structure :

The ultrastructure of the mitochondria have been studied under electron microscope.

A typical mitochondria is about 15.000 A° long and 5.000 A° in diameter. It is bounded by two unitil membrane, namely an outer and an inner mitochondrial membrane. Each membrane is about 60 A° in thickness. The two membranes are separated by a space about 60 A° to 80 A°. The space between the outer and inner mitochondrial membrane is called inner membrane space. This space is filled with a watery fluid of low viscosity and density and it is rich in coenzymes. The central space of the mitochondria which is bounded by the inner chamber is called the inner membrane space. The inner chamber is filled with mitochondrial matrix which contain filamentous material or dense granules ribosomes and mitochondrial DNA. The inner mitochondrial membrane gives out certain finger like projections into the inner chamber known as cristae mitochondria.

The electron microscope has revealed the presence of thousands of very small particles which are adhered to the outer surface of the outer membrane and inner membrane are stalked called subunit of F₁ - F₀ complex. These particles are also called elementary particles or F₁ particles or

oxysomes or electron transport particle. Each stalked particle consist of a base piece, a stalk and head piece. They are regularly placed the distance of about 100 \AA .

The mitochondria contain 65-75% protein 25 to 30% lipid, 0.5% RNA and small amount of DNA small amount of sulphur, Iron, copper, and some vitamins are present.

Functions of Mitochondria :

1. Thermogenesis -

In young mammals and mammals such as bats there is a special tissue in chest region. It is called brown fat. It consist of extensive vasculatisation and numerous mitochondria.

Here mitochondria are concerned with the release of heat energy rather than synthesising ATP.

2. Protein Synthesis -

Mitochondria contain DNA, about 5 to 10% of protein of mitochondria are synthesized by the mitochondrial genes.

3. Synthesis of steroid Hormones -

conversion of cholesterol to steroid hormone in the adrenal cortex catalysed by mitochondrial matrix.

4. Urea Cycle -

In urea cycle, urea is synthesized first step

of urea cycle that the conversion of ornithine into citrulline takes place in the mitochondria.

5. Energy Supply -

Mitochondria synthesize the energy rich compound ATP. It is stored in the mitochondria.

6. Cell Respiration -

It includes 1) Glycolysis 2) Oxidative decarboxylation 3) Krebs cycle 4) Electron transport system - 5. Oxidative phosphorylation.

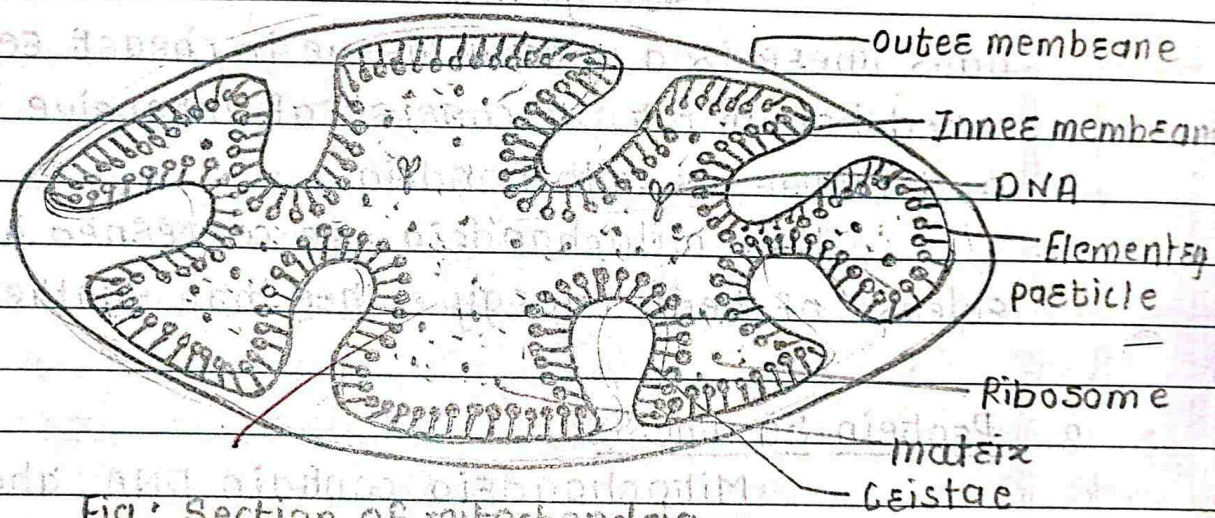
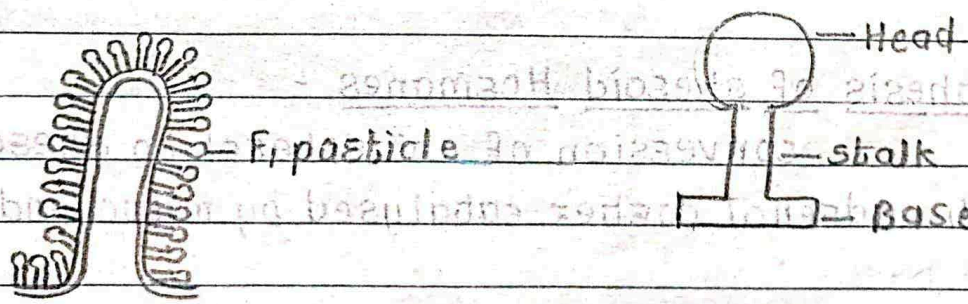


Fig: Section of mitochondria



A cristae showing F₁ particle

Q. 3. Short notes :

B. Homologous and Analogous Organ :

Homology and Analogy : Divergent evolution and convergent evolution

Homologous Organ :

Homologous organ are defined as the organ of different that are having similar structure but differ in their functions.

Examples of homologous organs are the forelimb of frog, man and Haploids of the whale. The structure of these animals are the same but the function are different. Haploids are used for swimming, the forelimbs of frog are used for jumping and forelimbs of man used for writing, eating, holding things etc.

In biology homology is similarity due to shared ancestry between pair of structure or genes in different taxa.

Evolutionary biology explains homologous structure adapted to different purpose as of descent with modification from common ancestor. Homology shows divergent evolution from common ancestor.

Analogous Organ :

Analogous organ are defined as the organ of different animals that are having different structure but perform the same function.

Examples of analogous organ is the wings of insect and the wings of birds. The structure of wings of birds covered by flesh skin and feathers. Whereas the wings of insects is an extension of integument but in both the cases the wings are used for flying.

These organism would have to adapt to the same ecological niche as other organism. Hence they may have evolved similar organ.