

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur (Autonomous)
Department of Zoology
Academic Year: 2018-2019

Unit Test- I for B.Sc. III

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Vivekanand College (Autonomous), Kolhapur
Department of Zoology

NOTICE

Date: 03/09/2018

All the students of B.Sc. Part III are here by informed that there will be Unit test of Zoology subject on date 20th September 2018 at Department of Zoology at 11 am. All students should present for the unit test. It is compulsory for all students.



Head Department of Zoology

Head,
Department of Zoology
Vivekanand College,
Kolhapur (Autonomous)

**VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)
DEPARTMENT OF ZOOLOGY**

Unit Test- I

B.Sc. Part III

Date 20/09/2018 Marks- 20

Q. Attempt any two of the following

1. What is nutrition? Explain nutrition in protozoa.
2. Describe various input and output devices of computer.
3. What are requirements for PCR? Explain mechanism of PCR.
4. Describe the histological structure and function of thyroid gland.

Vivekanand College, Kolhapur
Department of Zoology
B.Sc. III Unit Test I Mark list

Total Marks 20

S.N.	Name of Students	Marks obtained
1	Atyalkar Vinay M.	13
2	Chokakkar Prafull Madan	18
3	Desa Rafel Rujay	16
4	Gaikwad Nivedita Babasaheb	19
5	Godad Monika Anton	Ab
6	Golandaj Paravej A.	15
7	Hange Omkar Atul	Ab
8	Kamble Nilam Chandrakant	14
9	Kamble Nisha Dinkar	15
10	Kapse Suraj V.	17
11	Mane Shivani Kiran	18
12	Naik Manjula Bhimrao	17
13	Patil Trupti Tanaji	16
14	Pawar Aniket Anil	Ab
15	Rajput Nilesh Mansing	16
16	Sayyad Yasmeeen Ismail	Ab
17	Shirke Abhishek Chandrakant	19
18	Singh Varsha	20
19	Sutar Akshata Parsharam	20
20	Patil Rutuja Rajendra	19
21	Patil Pooja Ravindra	Ab
22	Ekal pooja Suresh	20
23	Chougule Aruna Dhondiba	20
24	Patil Snehal Sarjerao	20
25	Amate Supriya	16
26	Sanap Pooja	Ab

Prafull

Head,
 Department of Zoology
 Vivekanand College,
 Kolhapur (Autonomous)

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥

- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

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Suppliment No. :

Roll No. : 8775

Class : B.Sc. III

Signature
of
Supervisor

Subject :

Test / Tutorial No. :

Div. :

Q.1 What is Nutrition? Explain nutrition in protozoa.

Nutrition:-

Mode - Holozoic or zoo trophic nutrition. Majority of protozoa nutritive holozoidically i.e like animals on solid food. This mode by nutrition essentially involves the processes like intake of food i.e ingestion, digestion, absorption and egestion of undigested residues.

Seven important mode of Nutrition:-

The Modes are:-

1. Holozoic or zoo-Trophic Nutrition

2. pinocytosis Nutrition

3. Autotrophic or Holophytic Nutrition:

4. Saprozoic nutrition:

5. parasitic nutrition

6. Coprozoic nutrition

7. Mixtrophic nutrition.

1. Holozoic OR zoo-trophic Nutrition.

- i. Majority of protozoa nutritive holozoically, i.e. like animals on solid food.
- ii. The food of protozoa consist of microorganism like bacteria, diatoms, rotiferas, crustacean larvae orther protozoans, algae, small fragments of large animals and plants.
- iii. This mode of nutrition essentially involves the process like intake of food i.e. ingestion, digestion, absorption and egestion of undigested residues.

2. pinocytosis.

- i. pinocytosis OR cell drinking has also been and also reported in some protozoa like Amoeba proteus and also in certain flagellates and ciliates
- ii. It is related to ingestion of liquid food by invagination of general body surface.
- iii. It may occur at any part of the body during pinocytosis.
- iv. Some pinocytic channels are formed from the outer body surface deep into the body.
- v. The separated pinosomes becomes the food vacuoles.
- vi. The process is induced in presence of certain salts and some proteins.

3. Autotrophic OR Holophytic nutrition.

- I. protozoa with chlorophyll or some allied pigment can manufacture complex organic food, like those of green plants, from simple inorganic substances e.g. Euglena, Noctiluca.
- II. often there may be protein bodies called pyrenoids which are centers of photosynthesis.
- III. Some protozoa have no chromatophores but they have chlorophyll bearing algae.
- IV. Nitrates or ammonium compounds are sufficient as the source of nitrogen for the autotrophic forms.

4. Saprozoic Nutrition:-

- I. some protozoa absorb complex organic substance in solution through the body surface by the process of osmosis called 'osmotrophy'.
- II. This protozoa called 'saprozoic'.
- III. Saprozoic forms ammonium salts, amino acid, or peptones for their nutritional requirement.
- IV. species of Euglena absorb nutrients from their surrounding environment through their general body surface.

5. parasitic Nutrition:-

- I. The parasitic forms feed either holozoically OR saprozoically.
- II. Mode of feeding.
 - a. food robbers:-
 1. digested foodstuffs of their hosts are known as food robbers.

2. food robbers generally non-pathogenic to their hosts.

b. pathogenic

1. The protozoan parasites causing harm to their hosts usually feed up on the living tissues of the host.

2. They absorb liquid food through their general body surface.

3. example :- plasmodium.

6. Coprozoic Nutrition:-

1. certain free living protozoans are in habit of feeding upon the faecal matters of other organisms.

ii. organisms: like *clamydophrys* and *dimastigamoeba*.

7. Mixotrophic Nutrition:-

1. Some protozoa nourish themselves by more than one method at the same time at different times due to change in environment, this is called as "Mixotrophic Nutrition".

ii. *Euglena gracilis* and *paramecium* are both saprozoic and autotrophic in their Nutrition.

iii. some flagellates are both autotrophic and zootrophic.

Therefore, above all mention of Mode of Nutrition (7 modes) of protozoa.

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Q. What are requirement of PCR? Explain mechanism of PCR
 PCR or polymerase chain reaction is a technique used in molecular biology to create several copies of a certain DNA segment. This technique was developed in 1983 by Kary Mullis, an American biochemist. PCR has made it possible to generate millions of copies of a small segment of DNA. This tool is commonly used in the molecular biology and biotechnology labs.

• principle of PCR

The PCR technique is based on the enzymatic replication of DNA. In PCR, a short segment of DNA is amplified using primer mediated enzymes. DNA polymerase synthesises new strands of DNA complementary to the template DNA. The DNA polymerase can add a nucleotide to the pre-existing 3'-OH group only. Therefore, a primer is required. Thus, more nucleotides are added to the 3' prime end of the DNA polymerase.

• components of PCR / Requirements for PCR.

components of PCR constitutes the following.

1. DNA Template - The DNA of interest from the sample.

2. DNA polymerase - Taq polymerase is used. It is thermostable and does not denature at very high temperatures.

3. oligonucleotide primers - These are the short stretches of single-stranded DNA complementary to the 3' ends of sense and anti-sense strands.

4. Deoxyribonucleotide triphosphate - These provide energy for polymerization and are the building blocks for the synthesis of DNA. These are single units of bases.

5. Buffer system - Magnesium and potassium provide optimum conditions for DNA denaturation and renaturation. It is also important for fidelity, polymerase activity, and stability.

• Types of PCR

PCR is of the following types:

1. Real-time PCR

In this type, the DNA amplification is detected in real-time with the help of a fluorescent reporter. The signal strength of the fluorescent reporter is directly proportional to the number of amplified DNA molecules.

2. Nested PCR

This was designed to improve sensitivity and specificity. They reduce the non-specific binding of products due to the amplification of unexpected primer binding sites.

3. Multiplex PCR

This is used for the amplification of multiple targets in a single PCR experiment. It amplifies many different DNA sequences simultaneously.

4. Quantitative PCR -

It uses the DNA amplification linearity to detect, characterize and quantify a known sequence in a sample.

5. Arbitrary primed PCR

It is a DNA fingerprinting technique based on PCR. It uses primers the DNA sequence of which is chosen arbitrarily.

• Mechanism of PCR

The PCR involves three major cyclic reactions:

1. Denaturation.

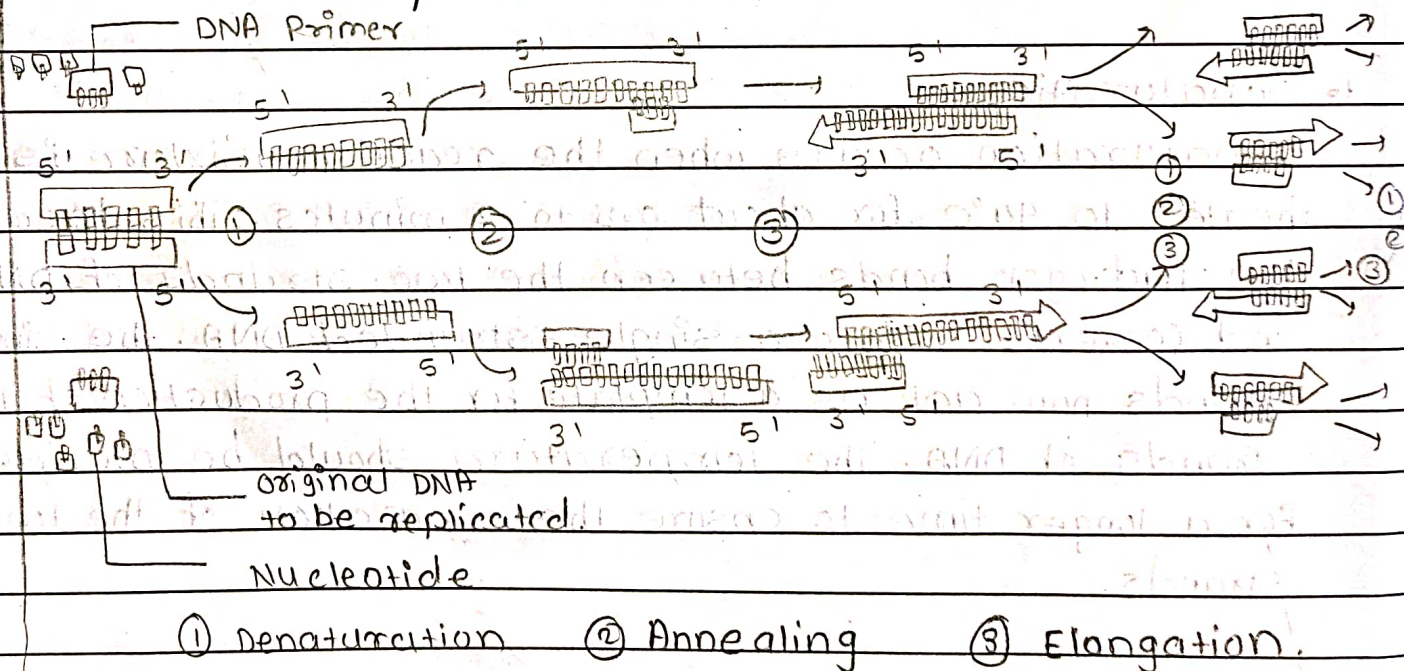
Denaturation occurs when the reaction mixture is heated to 94°C for about 0.5 to 2 minutes. This breaks the hydrogen bonds between the two strands of DNA and converts it into a single-stranded DNA. The single strands now act as a template for the production of new strands of DNA. The temperature should be provided for a longer time to ensure the separation of the two strands.

2. Annealing.

The reaction temperature is lowered to $54-60^{\circ}\text{C}$ for around 20-40 seconds. Here, the primers bind to their complementary sequences on the template DNA. Primers are single-strand sequences of DNA or RNA around 20 to 30 bases in length. They serve as the starting point for the synthesis of DNA. The two separated strands run in the opposite direction and consequently there are two primers - a forward primer and a reverse primer.

3. Elongation

At this step, the temperature is raised to $72-80^{\circ}\text{C}$. The bases are added to the 3' end of the primer by the Taq polymerase enzyme. This elongates the DNA in the 5' to 3' direction. The DNA polymerase adds about 1000 bp/minute under optimum conditions. Taq polymerase can tolerate very high temperatures. It attaches to the primer and adds DNA bases to the single strand. As a result, a double-stranded DNA molecule is obtained. These three steps are repeated 20-40 times in order to obtain a number of sequences of DNA of interest in a very short time period.



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• Application of PCR

The following are the applications of PCR:

Medicine

- Testing of genetic disease mutations.
- Monitoring the gene in gene therapy.
- detecting disease-causing genes in the parents.

Forensic science

- used as a tool in genetic fingerprinting.
- Identifying the criminal from millions of people.
- paternity tests.

Research and Genetics

- compare the genome of two organisms in genomic studies.
- In the phylogenetic analysis of DNA from any source such as fossils.
- Analysis of gene expression.
- Gene Mapping.