Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Zoology
Academic Year 2024-2025
B. Sc. III Semester VI

Notice

Date:24/02/2025

All students of B. Sc III are hereby informed that your open book test for paper Aquatic Biology is scheduled on 27th February 2025 at 12.00 pm to 1.00 pm. Attendance is mandatory to all students. Students who remain absent for examination will be responsible for their own loss.

Ms. P. S. Shetfalkar
Teacher Incharge

Dr. G. K. Sontakke
HEAD
DEPARTMENT OF ZOOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Zoology

Academic Year: 2024 –25

Class-B.Sc.-III Sem-VI **Date:** 27/02/2025

Name of the Paper: Aquatic Biology **Time-**12-1 pm

Question Paper

Q1. Long Answer question 15 Marks

a) Explain the adaptation of hill stream fishes

b) Write Difference between lotic and lentic water

Ms. P.S. Shetfalkar

Teacher Incharge

Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Zoology
Academic Year 2024-2025
B. Sc. III Semester VI

Date: 27/02/2025

Attendance- Aquatic Biology

Sr. No.	Roll No.	Name of Student	Signature
1	8341	Abrange Vaishnavi Vinod	V.V. Abrange.
2	8342	Chougule Shraddha Shivaji	Shraddha.
3	8343	Dindayal Prabodhini Raju	P.R. Dindayal.
4	8344	Jadhav Suyash Kuber	Sky.
5	8345	Kamble Rutuja Vishal	R Kamble.
6	8346	Katkar Siddhi Sanjay	Skatkar.
7	8347	Kukade Priyanka Sandeep	Pk.
8	8348	Mansuri Sahida Allauddin	M.Sahida
9	8349	Mishra Shambhavi Mukesh Kumar	Shambhavi
10	8350	Mitake Komal Anil	KAM
11	8351	Mulla Mahamadkaif Shahanul	[illegible]
12	8352	Nayakavadi Ashiya Riyaj	ARNaikwadi
13	8353	Patil Pradnya Rajendra	Patil
14	8354	Raje Shruti Sudarshan	Raje.
15	8355	Rathod Sonali Ramesh	Rathod
16	8356	Sayyad Afroja Aslam	Sayyad.
17	8357	Shaikh Ayesha Aslam	Ashaik
18	8358	Singh Priya Gopal	Priya
19	8359	Ustad Rifat Nasirkhan	Rustad

Ms. P. S. Shetfalkar
Teacher Incharge

Dr. G. K. Sontakke
HEAD
DEPARTMENT OF ZOOLOGY
VIVEKANAND COLLEGE KOLHAPUR

॥ ज्ञान, विज्ञान आणि सुंसस्कार यासाठी शिक्षण प्रसार ॥
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

SUPPLIMENT

15/15

Jr. Supervisor's Sign. :	
Students Sign. :	
Seat No. :	
Seat No. in words :	
Suppliment No. :	
Centre	

प्र. क्र.
Q. No.

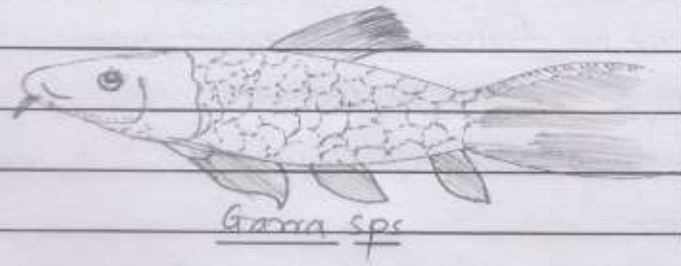
Name : Shrāddha Shivaji Chougule

Paper - XVI : Aquatic Biolo
Class : Bsc TY Zoolo
Roll no : 8342

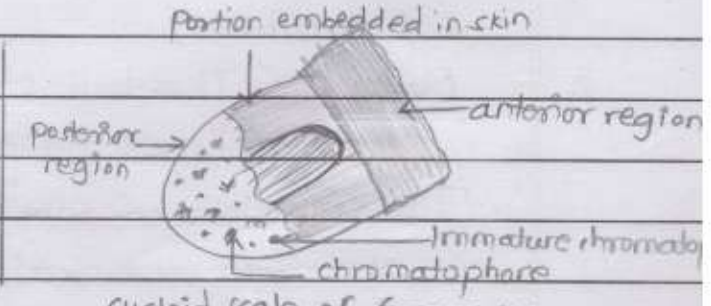
Que 1 Explain the adaptation of hill stream fishes

⇒ The structural adaptation of the fishes inhabiting the river and streams of the hills are as below

1. External Features :- The size of the body is very small and hig flattened dorsoventrally, to enable easy movement in the fast flowing stream. Dorsoventrally flat body : Balitora, Garra, Glyptosternum. leaf like body : Glyptothorax
Arched body on dorsal side : Garra sps.
The small size of the body enables them to hide under the sto and rocks.



Garra sps



cycloid scale of Garra sps

2 Scales : The small-sized scales are located on dorsal and lateral sides of skin of fish, while they are reduced or totally absent on ventral side. The smooth ventral surface helps th fish to attach to the substratum.

02 Section	Q. No.												
	Marks												

प्र. क्र.
Q. No.

3. Paired fins :- The paired fins are large and adapted for adh to substratum. The outer fin rays are thick, flat an in number. The fishes of genus Gomma are provided with suc disc, behind mouth. This organ helps to attach to substratum.

4. Caudal fin and its Peduncle :- The hill stream fishes poss elongated, narrow, caudal peduncle as an adaptation t survive in the rapid flowing waters. eg :- Glypthothorax, et The lobes of caudal fin are unequal, wherein upper lobe o Caudal fin is smaller than the lower one.
In sisor, caudal fin in shape of whip-like tail

5. Mouth :- is crescentic or semi-circular in shape and pos on the ventral side. Horny covering on jaws help to pull out alga from the stones for feeding.

6. Lips :- lips of fishes form different types of suckers. Th serve to dig out mud as well as for attachment t substratum

7. Barbels :- barbels are short and highly reduced, to end easy movement in fast flowing waters. In Nemad the lips form a ring-like sucker. In Glyptosternum and Glyptothorax, the lips form a broad sucker for adheri substratum.

8. Eyes :- The hill stream fishes possess dorsally plac small eyes. Eg :- Balitora brucei, Glyptothora The location of eyes on dorsal side enables ventral to attach to substratum

9. Gill opening and Branchiostegal Rays :- Gill openings much reduced & lie on sides. They have important follo functions :- (i) exchange of gases (ii) regulation of ions (iii) regulation of acid-base balance (iv) elimination o nitrogen.

Section	Q. No.													03
	Marks													

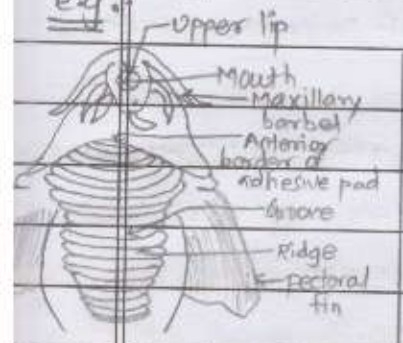
प्र. क्र.
Q. No.

The main components of gills are Gill rackers, gill arch, gill filaments or primary lamellae and Gill-lamellae or secondary lamellae

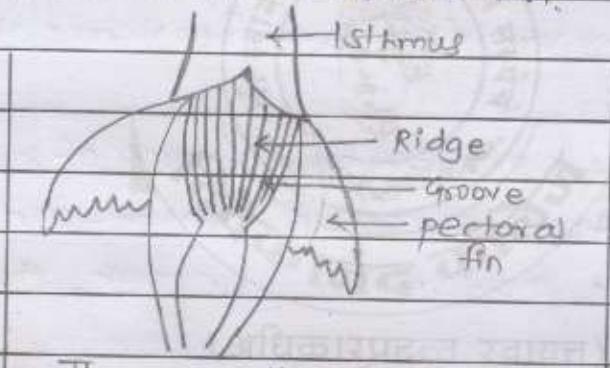
10. Air Bladder :- Air bladder functions as a hydrostatic organ in fish. But in the case of hill stream fish the air bladder is very much reduced or degenerate type because it has no function as hydrostatic organ.

11. Adhesive Devices :- skin of the hill stream fishes are modified in various ways to form adhesive organs such as suckers, cushioned pads, grooves and ridges for the purpose of attachment to the substratum.

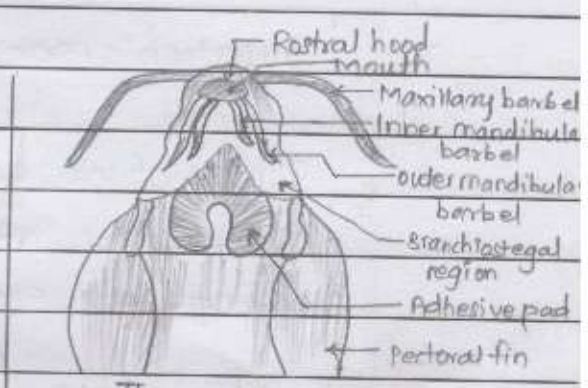
e.g:-



Thorac Adhesive Apparatus of Pseudoecheneis



Thoracic Adhesive Apparatus of Glyptothorax



Thorac Adhesive Apparatus of Pseudoecheneis

Que 2: Difference between lotic and lentic ecosystem

	Lotic Ecosystem	Lentic Ecosystem
1.	It is running water. water flows in a specific direction. The uni-directional flow of water is along the slope in response to gravity.	It is standing water. water does not flow in any direction, but remains confined / stationary / static / still.
2.	Ex:- Rivers, creeks, brook, streams, springs, rivulets, channels	Ex:- Wetlands, bogs, seeps, tanks, ponds, ditches, swamps, lakes, reservoirs, pools

04 Section	Q. No.												
	Marks												

प्र. क्र. Q. No. 3	Lotic Ecosystem	Lentic Ecosystem
	Flow of water present	Flow of water absent.
4	Size of waterbody is linear structure	size of waterbody is circ or nearly circular in shape
5.	Narrow width or Breadth	Broad width or Breadth.
6.	Depth of waterbody is shallow.	Depth of waterbody is very d
7.	Duration is many yrs of existence	few years of Duration of ex
8.	Source of water is provided by lower-order streams, precipitat, springs, glaciers, snowmelts	source of water is provided higher-order streams, ri creek, stream.
9.	Water retention depends upon supply. It has more water after heavy rain & less water at time of drought	water retains for long duration.
10	High dissolved oxygen content present	low oxygen content in deep layers
11.	Low salt content and low rate of speciation	High salt content due to evapo of water and High rate of sp
12.	High species diversity & primary producers are phyto-plankton - diatoms, dinoflagellates.	low species diversity and i produc Mesophytic plants or herbs, floatin submerged hydrophytes, Diatoms, dinoflagellates.

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Zoology
Academic Year 2024-2025
B. Sc. III Semester VI

Notice

Date:17/02/2025

All students of B. Sc III are hereby informed that your open book test for paper ecology and toxicology is scheduled on 20th February 2025 at 12.00 pm to 1.00 pm. Attendance is mandatory to all students. Students who remain absent for examination will be responsible for their own loss.

Teacher Incharge
Dr. S. S. Desai

Dr. G. K. Sontakke
HEAD
DEPARTMENT OF ZOOLOGY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Zoology
Academic Year: 2024 –25

Class-B.Sc.-III Sem-VI **Date:** 20/02/2025

Name of the Paper: Ecology and Toxicology **Time-**12-1 pm

Question Paper

Q1. Long Answer question 15 Marks

a) What is succession? Describe Primary and secondary succession.

b) Write note on cadmium toxicity

Dr. S. S. Desai

Teacher Incharge

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Department of Zoology
Academic Year 2024-2025
B. Sc. III Semester VI

Date: 20/02/2025

Attendance- Ecology and Toxicology

Sr. No.	Roll No.	Name of Student	Signature
1.	8341	Abrange Vaishnavi Vinod	V.V. Abrange
2.	8342	Chougule Shraddha Shivaji	Shraddha
3.	8343	Dindayal Prabodhini Raju	P.R. Dindayal.
4.	8344	Jadhav Suyash Kuber	Sky.
5.	8345	Kamble Rutuja Vishal	R Kamble
6.	8346	Katkar Siddhi Sanjay	Skatakar.
7.	8347	Kukade Priyanka Sandeep	Pk.
8.	8348	Mansuri Sahida Allauddin	M. Sahida
9.	8349	Mishra Shambhavi Mukesh Kumar	Shambhavi
10.	8350	Mitake Komal Anil	KAM
11.	8351	Mulla Mahamadkaif Shahanul	[illegible]
12.	8352	Nayakavadi Ashiya Riyaj	ARNayakavadi
13.	8353	Patil Pradnya Rajendra	Patil
14.	8354	Raje Shruti Sudarshan	Raje
15.	8355	Rathod Sonali Ramesh	Rathod
16.	8356	Sayyad Afroja Aslam	Sayyad.
17.	8357	Shaikh Ayesha Aslam	AAaik.
18.	8358	Singh Priya Gopal	Priya
19.	8359	Ustad Rifat Nasirkhan	RUstad

Dr. G. K. Sontakke
HEAD
DEPARTMENT OF ZOOLOGY
VIVEKANAND COLLEGE, KOLHAPUR

॥ ज्ञान, विज्ञान आणि सुंसस्कार यासाठी शिक्षण प्रसार ॥
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

SUPPLIMENT

Jr. Supervisor's Sign. :	
Students Sign. :	
Seat No. :	
Seat No. in words :	
Suppliment No. :	
	8333
Centre	

प्र. क्र.
Q. No.

14/15

Name: Vaishnavi Vinod Abrange Class: B.S.c TY Zoolog
Paper: XV: Ecology & Toxicology Rollno: 8341

Q1] What is succession? Describe primary & secondary success
→ Ecological succession is the series of changes in an ecosystem when one community is replaced by another community as a result of changes in biotic and abiotic factors.

① Occurs in all types of ecosystem i.e. forests, ponds, coral reefs, et
② It is characterised by increased productivity, The shift of nutrien from the reservoir, Increased diversity of organisms with increase niche dwelopment, gradual increase in the complexity of food web
③ Ecological succession is caused by physical environment, Natural disturbance, Human disturbance, clearing land, climate chang Introduction of non-native species, Natural disasters such a volcanic, eruptions, forest fires, hurricanes and floods.
④ Ecological succession occurs because it is the process of life for plants, soil and other living organisms, because organisms alter soil structure, chemistry and microclimates, the spec

02 Section	Q. No.												
	Marks												

प्र. क्र.
Q. No.

composition of ecological communities constantly changes over time.

(5) Succession will continue until the environment reaches it's fi stage - the climax community.

(6) There are two main types of succession.

(a) Primary Succession (b) Secondary Succession.

(a) Primary Succession: The process of creating and developing an ecosystem in an area that was previously uninhabited eg of uninhabited areas are slides of volcanoes and sites of glacier recession.

The 1st organisms to appear are lichens.

Masses soon appear, and grasses take root in the thin layer of soil Eventually, tree sudings and shrubs sprout among the plant community.

Starts with arrival of living things such as lichens that do not need any soil to survive. They are called Pioneer species.

(b) Secondary Succession: Secondary Succession occurs on a surf where an ecosystem has previously existed. It is the process by which one community replaces another community which has been partially or totally distroyed, might be by natural process such as floods, earthquake, etc.

When an existing community has been cleared by any type of disturbance, such as fire, cyclone etc and the soil remai intact, the area begins to return to its natural community. Because these habitats previously supported life, secondary succession begins.

Because organisms alter soil structure and species communities constantly change over a period of time.

Section	Q. No.													
	Marks													

प्र. क्र.
Q. No.

Succession will continue until the environment reaches its final stage - the climax community.
Secondary succession is never ending process.
Eg:- 1. A stable deciduous forest community.
2. A disturbance, such as wild fire, destroys the forest.
3. The fire burns the forest to the ground.
4. The fire leaves behind empty, but not destroyed soil.
5. Small bushes and trees begins to colonize the area. The ecosystem is now back to a similar state to where it began.

Q2] Cadmium Toxicity :-
→ Cadmium (Cd) is a soft, bluish-white metal. Used as a corrosion-resistant plating on steel cadmium compounds are used as red, orange and yellow pigments, to colour glass, and to stabilize plastic. Has no known biological functions in higher organisms. Cd is hazardous both by inhalation and ingestion and can cause acute and chronic intoxications. It accumulate in liver and kidneys the transported to blood and then processed through liver and kidney.
The cd is eliminated through faeces and urine, as well as hair and breast milk.
Action: It binds to sulfhydryl groups, denature proteins or inactivating enzymes. It also interferes with calcium transport mechanisms leading to intracellular hypercalcemia and ultimately apoptosis.
Cadmium (2-7%) is absorbed through GIT and its absorption is enhanced when the diet is deficient in calcium, iron or protein

04 Section	Q. No.												
	Marks												

प्र. क्र.
Q. No.

Absorption through respiratory tract is more efficient, ranging from 15-50% of an inhaled dose.
It binds to RBCs, plasma albumin.
Impair vitamin D metabolism - affect absorption of Ca & P resul in osteomalacia and osteoporosis, also affect haematopoes cd also directly induces oxidative stress. Toxicity by inhalatio is far greater than by ingestion.
On Inhalation :- Symptoms develop usually after 4-8 hrs.
They are influenza - like. It is characterized by sneezi sore throat, irritant cough, nausea, headache and cyanosis ('cadmium blues').
On Ingestion :- Symptoms occur in 1 hr. These are increased salivation, nausea, vomiting, cramps in abdomen, diarrhea and rarely death.
Chronic exposure :- Yellowing of teeth Cadmium ring formatio bone: pain, fractures with osteomalacia and chronic renal failure, Hypertension. Cadmium is said to be carcinogenic, and increased incidences of lung, prostate, pancreas, bladde carcinoma has been reported.
Cadmium poisoning occurred in 1946 from the contaminatio of food and water by mining effluents in Japan resulting in outbreak of 'itai - itai' disease, so named as cadmium induced bone toxicity led to painful bone fractures.