

FISHERIES TECHNOLOGY

(NA, NB, NC)

Std. XII

General Information

1. There will be three papers under the vocational course in Fisheries Technology, the titles of which are as below:-
Paper I- S4 -Aquaculture
Paper II - S5 - Fish Farm Management
Paper III -S6- Fish Preservation and Processing
2. The practical examination of above papers will be of 80 marks each, and 10 marks each are to be given for OJT, Educational visits, Term Work and Project Work.
3. The duration of examination of each paper will be 3 hours.
4. During practical examination, the students are expected to attend with full physical and mental involvement.
5. Maximum five students are allowed to form a group to perform one experiment.
6. A batch for practical examination should not exceed 20 students.
7. List of materials, experiments, chemicals is given in scheme of practical examination of each paper.
8. The material charges for each paper will be approximately Rs. 50/- per student.

Instructions to the Head of Institution

1. Practical examination must be conducted strictly as per the programme and instructions sent by the Board
2. The detailed programme of practical examination including time table should be fixed well in advance and informed to the students.
3. The Head of the Institution should confirm that all the necessary arrangement for the examination is made well in advance in consultation with the internal examiner.
4. The list of materials, equipments, chemicals etc. required for the practical examination is given in the scheme of practical examination.
5. In case, the external examiner fails to attend the examination, then the head of the institution should appoint an external examiner from nearby institute and if no examiner from nearby institute is available, then a teacher from the same institute who is in touch with the subject should be appointed.
6. The external examiner should submit the entire examination report to the Board Office and the DVEO, immediately after examination. This report should be confidential and it must contain experimental changes, if any, due to non-availability of materials, lack of time or expensive instruments.

Instructions to Candidates

1. Students should be present half an hour before the commencement of practical examination and report themselves to the Internal Examiner.
2. They should have all necessary materials such as pen, compass box, and certified record book/ journal.
3. They should write only on the answer sheet supplied to them.
4. Before leaving the place of examination, the student should ascertain that he has completed all items of practical.
5. Every student is expected to submit his record book/ journals, visit diary & project report at the time of practical examination.

Fisheries Technology

Std-XII

Paper I - Aquaculture - NA

Scheme of marking

Time:- 3 hrs

Total marks:-80

Q1.Experiment on testing PH of Soil (Given sample)	16
i. Correct Procedure	08
ii. Observation	06
iii. Result	02
Q2.Experiment on any one	16
i. Bamboo splits of given size	06
Fabrication of cage	10
ii Selection and weighing of ingredients	06
Preparation of culture media required for culture of live fish food organisms.	10
iii Isolation.	08
Preparation of slide	02
Identification with distinguishing characters	06
Q3. Experiment on mounting and identification (any one)	10
Preparation of slide	04
Identification	02
Description with diagram	04
Q4. Draw a neat well labeled diagram (any two)	08
Correct diagram/design/layout	04
Correct labeling	04
Q5. Spot No 1 to 10	20
Correct identification of each spot	01
Description of each	01
(With Figure if required)	
Q6.Viva-Voce	05
(Correct answer of 5 questions)	05
Q7.Record book/journal	05

Paper I Aquaculture - NA

Instruction to the Internal and External Examiners.

Q1. Provide "ready to analyse" soil sample, necessary chemicals and other materials. At least two characteristically different soil samples must be used and provided to the student alternately

Q2.

- i) For fabrication experiments, the examiners may form batches of two or three students each. The size is to be decided by the examiner. The required material, equipment should be provided to each batch.
- ii) The examiner shall provide all the necessary ingredients required for culture of live fish food organisms.
- iii) The examiner shall provide the culture of live fish food organisms.

Q3. Provide microscope, water with plankton sample, slide etc.

Q4. To draw the diagram/ designs/ layout, examiner should provide drawing sheet to the students.

Q5. The examiners should keep spots from following categories.

- i) Fresh water cultivable fish (any one from the following)
Indian major carps, common carp, Chinese carps, air breathing fishes etc.
- ii) Brackish water cultivable fishes (any of the following) Milk fish, Pearl spot, Mullet, Jitada
- iii) Live fish food. any one of the phytoplankton or zooplankton.
- iv) Cage.
Small model of cage or any of the components, accessories such as skeleton, netted side, feed box.
- v) Shell fish - *Penaeus* sp. *Macrobrachium* sp. (any one)
- vi) Any one from larval stage of prawn.
- vii) Aquatic weed.
- viii) A spot on visited fish farm - anyone from layout of farm, hatchery model, Sluice gate design etc.
- ix) Mussel.
- x) Oyster / Pearl.

Q6. Viva voce

At least five questions related to the subject should be asked by the examiner to each student, the viva- voce is to be conducted during the practical examination itself.

Q7. Record book / journal

Record book / journal of each student should be checked and signed by both the examiners.

Fisheries Technology

Paper I Aquaculture - NA

Scheme of practical examination

Time 3 hrs

Marks : 80

Question / Experiment

Q1 - Experiment on soil analysis	16
i) Analyse the given soil sample for its pH	06
ii) Analyse the given soil sample for Phosphate content / Nitrate content/potashcontent/ water holding capacity.	10
Q2 - Experiment on any one	16
i) Fabricate the cage model with the help of given material	
ii) Prepare a culture medium with the help of given ingredients	
iii) Identify and isolate live fish food organism from the given medium	
Q3 - Experiment on mounting and identification (any one)	10
i) Make a temporary slide of phytoplankton from the given water sample, identify and describe.	
ii) Make a temporary slide of zooplankton from the given water sample, identify, and describe.	
Q4 - Draw neat well labeled diagram. (any two)	08
i) Draw a well labeled diagram of cross section of an embankment.	
ii) Draw a well labeled diagram of cross section of typical fish pond.	
iii) Give a layout of fish farm visited by you.	
iv) Give design of closed type of sluice gate.	
v) Give design of open type of sluice gate.	
vi) Give a sketch of tide-fed brackish water fish farm and label.	
Q5 - Identify and comment on the given spot No. 1 to 10.	20
Q6 - Viva voce	05
Q7 - Record book (journal)	05

Paper I Aquaculture. NA

Assessment of term work and project work

In addition to the practical examination of 80 marks, the examiner should examine students for 40 marks. These 40 marks include 10 marks for term work and 10 marks for project work. The evaluation of term work should be on the basis of academic performance of the student, attendance, general behavior, visit diary etc.

For the evaluation of the project report, both the examiners should examine and sign project report submitted by the student. The project may be on various aspects of aquaculture such as stock manipulation in managed fish pond, ornamental fish culture, aquaculture in water logged land etc.

Remaining 20 marks are to be given for On the Job Training (OJT) and Educational Visits. 10 marks for OJT and 10 marks for Educational visits.

Paper II - Fish Farm Management NB Scheme of Practical Examination

Time : 3 hrs

Total marks : 80

Q1) Questions/ Experiments.	16
a) Analyse the given water sample for pH.	06
b) Analyse the given water sample for determination of Dissolved oxygen / CO ₂ / Total alkalinity	10
Q2) Attempt any one question.	12
a) Calculate the doses of manures and fertilizers for nursery pond of 20m x 10m size.	
b) Calculate the doses of supplementary food for a rearing pond of 40m x 20m size.	
c) Calculate the doses of organic manures for a pond of given water spread area and write the procedure of application.	
d) Calculate the doses of inorganic fertilizers for a pond of given water spread area and write the procedure of application.	
Q3) Attempt the following questions.	12
a) Quantitative estimation of zooplankton using Sedgwick Rafter cell.	06
b) Qualitative estimation of plankton from the given water sample.	06
Q4) Formulation of feed with the help of given ingredients.	10
Q5) Identify and comment on the given spots (1 to 10)	20
Q6) Viva voce	05
Q7) Record book (journal)	05

Paper II - Fish Farm Management NB

Scheme of Marking

Time: 3 hrs

Total marks: 80

Q1) Question / Experiment	16
a) Analysis of pH. Procedure, Observation and Results.	03 03
b) Estimation of Dissolved Oxygen / Free Carbon dioxide /Total alkalinity Procedure Observation and calculation Result	05 03 02
Q2) Any one of the following.	12
a) Calculation of doses of any two fertilizers	12
b) Calculation of doses of any two supplementary feed	12
c) Calculation of doses of any two manures Method of application	07 05
d) Calculation of doses of any two inorganic fertilizers Method of application	07 05
Q3) (a)	12
I) Methodology	04
II) Result	02
(b)	
I) Methodology	04
II) Result	02
Q4) Formulation of feed	10
Weighing of ingredient	05
Mixing	03
Skill	02
Q5) Identification of spots. Comment on each spot	20
Correct identification of each	01
Description of each (sketch, of necessary)	01
Q6) Viva voce	05
Q7) Record book (Journal)	05

Paper II - Fish Farm Management NB

Instructions to Examiners

Time : 3 hrs

Total marks :80

Q1) Water samples, chemicals and required materials should be provided to the students according to the parameters. Examiner should check and sign on the readings of each student. They should examine the procedure of the experiment.

Q2) III) and IV)

Water spread area is to be given by the examiners.

Q3) I) and II)

Water sample and other essential items shall be provided.

Q4) Ingredients with known protein content and quantity should be provided to the students.

Q5) Identification of spots 1 to 10

Each spot should be from different category or group. The categories and possible spots are as follows:-

1. Fry of any cultivable fish (Indian major carps, Chinese carps, Common carp)
2. Fingerling of any cultivable fish as above or prawn juvenile.
3. Predatory fish Wallago attu, Mystus spp.
4. Air breathing fish - Clarias spp. Channa spp. Heretopneustes spp.
5. Weed fish - Any available weed fish.
6. Zooplankton - any copepod, Cladoceran, rotifer etc
7. Phytoplankton - any green algae, blue green algae etc.
8. Any disease causing organism.
9. Shell fishes.
10. Aquatic plants.

Q6) At least five questions related to the Fish Farm management should be asked by the examiner to each student.

Q7) Record Book Journal of each student should be checked & signed by both the examiners.

Paper II - Fish Farm Management NB

Assessment of Term Work and Project Report

Instructions to Examiners.

In addition to the practical examination of 80 marks, the examiners should examine students for 40 marks. Out of the 40 marks, 10 marks are for term work of the students, which is on the basis of academic performance during the year, general behavior, visit diary etc. and 10 marks are for the projects submitted by the students during the year or at the time of examination. In Paper-II, the projects may be related to any of the management practices of work experience program, such as observations on temperature and turbidity, periodic sample netting and observation on growth and health etc. Both the examiners should examine the project reports.

Remaining 20 marks are to be given for On the Job training (OJT) and Educational visits. 10 marks for OJT and 10 marks for Educational Visits.

Paper III - Fish Preservation and Processing NC
Scheme of Practical Examination.

Time : 3 hrs

Total marks :80

Question / Experiment

Q1) Determination of freshness (any one)	08
i) Distinguish between the given fish specimen A and B on the basis of organoleptic methods and comment on their freshness.	
ii) Write down the organoleptic methods to determine freshness of fish.	
Q2) Experiment on salting (any one)	10
i) Dress the given fish and perform experiment of salting. Note the weight of fish and salt.	
ii) Dress the given fish for freezing. Calculate the percentage yield.	
Q3) Determine the TPC of the culture plate supplied to you having __ml of __dilution.	08
Q4) Comment on Gram's reaction from the plate supplied to you. Write the characters.	08
Q5) a) Sketch and label simple vapour compression system.	08
b) i) Identify and describe the given product.	04
ii) Give suitability of the packaging material with reasons.	04
iii) Comment on the given packaging material	04
Q6) Comment on the places visited by you (Any four of the following)	16
i) Retail fish market.	
ii) Wholesale fish market.	
iii) Ice factory.	
iv) Fish processing unit	
v) Fish landing center.	
vi) Profile of a primary fisheries co-operative society	
Q7) Vice voce	05
Q8) Record book (Journal)	05

Paper III - Fish Preservation and Processing NC

Scheme of Marking

Time: 3hrs

Total marks :80

Q1) Question / Experiment	
i) Organoleptic examination of fish A and B	08
Correct examination of A	03
Correct examination of B	03
Comments on freshness	02
ii) Any four correct points covering the organoleptic method	08
Q2) Experiment on salting	10
i) Dressing and salting of fish	
Weighing of fish and salt	02
Correct method for dressing	05
Correct salting method	03
ii) Weighing of fish	03
Dressing of fish	05
Percentage yield	02
Q3) Determination of TPC	08
correct handling	05
Result	03
Q4) Comments on Gram's Reaction	08
Preparation of smear	02
Staining procedure	03
Identification	01
Result	02
Q5) a) Diagram	04
Labelling	04
b) i) Identification	02
Description	02
ii) Suitability	02
Reasons	02
iii) Identification	02
Utility	02
Q6) Comment on four places visited by the students	16
Correct comments on each place	04
Q7) Viva - voce	05

Correct answer of at least five questions covering the subject.

Q8) Record book (journal)

05

Paper III - Fish Preservation and Processing NC

Instructions to Examiners

Time: 3hrs

Total marks :80

1.

i) Provide the students with A and B fish having different stages of freshness, preferably one fresh and other spoiled.

ii) As above.

2.

i) & ii) Raw material (fresh fish of moderate size) should be provided to each student. Clean salt and weighing apparatus with equipment to dress the fish are also to be kept ready.

3. Culture plates with known bacterial inoculation and known dilution should be given to the students.

4. Bacterial culture plate, necessary glassware and Gram's stains should be given to the students.

5. A) Self explanatory

B) 1) Any one product like fish liver oil, fish flour, fish chutney, prawn pickle etc
2) Product and packaging material should be given.

3) Any one packaging material like plastic sheet, plastic crates, wax carton, master carton, tin cans etc.

6. The comments written by the students should be on the basis of visits conducted during the year.

7. Viva - voce should be conducted during the practical examination itself. At least five questions are to be asked to each student. The questions should be related to the subject.

8. Both the examiners should check and sign the record book/journal submitted by the students.

Paper III - Fish Preservation and Processing NC

Assessment of Term Work and Project Report

Instructions to Examiners

In addition to the practical examination of 80 marks, the examiners should examine students for 40 marks. 10 marks are for the term work of the students, which is on the basis of academic performance during the year, general behavior, visit diary etc. and 10 marks for the projects submitted by the students at the time of examination in paper - III. The projects may be related to

fish transportation, byproducts, profiles of fish markets, profile of co-operative etc. Both the examiners should examine project reports.

Remaining 20 marks are for On the Job training and Educational visits. 10 marks for OJT and 10 marks for visits.