M.Sc. 3rd Semester Examination, 2023

FISHERIES SCIENCE

PAPER – FSC-301(Unit-1 & Unit-2)

Full Marks : 50

Time : 2 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

PAPER – FSC-301 (Unit-1)

(*Fisheries Statistics and Research Methodology & Ethics*)

1. Answer any *two* questions from the following: 2×2

   (*a*) Prove that AM ≥ GM ≥ HM with proper illustration.

(*b*) State the obejctive and purpose of research.

(*c*) What are the differences between law and hypothesis ?

(*d*) Define primary data and secondary data.

2. Answer any *two* questions from the following : 4×2

(*a*) Discuss different steps and elements in research process.

(*b*) State the importance of diagrammatic representation of data.

(*c*) Calculate the Coefficient of correlation between Length (X) and weight (Y) variables collected from *Cirrhinus mrigala* fish of a pond and comment on your result.

X(cm)	23	22	24	17	19	20	18	21
Y(g)	16	12	18	04	03	10	05	12

(*d*) Prove that AM ≥ GM ≥ HM with proper illustration.

3. Answer any *one* question from the following : 8×1

(*a*) Give general idea about plagiarism. Compute the standard deviation from the following frequency distribution

Length of fish (cm)	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Number of fish	5	12	15	20	18	10	6	4

$3 + 5$

(*b*) Mention important characteristics of a good researcher. Give an account on publication ethics. Differentiate between references and bibliography. $2 + 4 + 2$

PAPER — FSC-301 (Unit-2)

(*Immunology, Genetic Engineering and Bio-instrumentation*)

4. Write short note on any *two* of the following : 2×2

(*a*) Write the principle of chromatography.

(*b*) Write a note on first line of defense mechanism in fish.

(*c*) What do you mean by iso-electric point ?

(*d*) Write short note on *Taq* polymerase.

5. Write short note on any *two* of the following : 4×2

(*a*) Briefly describe different steps of polymerase chain reaction and its utility. 3 + 1

(*b*) What is phagocytosis ? Briefly discuss on mechanism of Phagocytosis. 1 + 3

(*c*) Write a note on antimicrobial proteins and their role in immune defense.

(*d*) Write the principle of centrifugation technique. Derive the equation for the calculation of relative centrifugal force (RCF). 1 + 3

6. Attempt any *one* of the following : 8 × 1

(*a*) Write the principle of electrophoresis. Describe the procedure of SDS-PAGE technique and its application. 1 + 6 + 1

(*b*) Describe the structure and function of different lymphoid organs in fish with suitable examples.

[Internal Assessment — 10 Marks]