



UNIVERSITY OF RUHUNA
FACULTY OF FISHERIES AND MARINE SCIENCES &
TECHNOLOGY

Academic Year 2022/2023

Bachelor of Science Honours in Marine and Freshwater Sciences Degree

Level II Semester II Examinations – April/ May 2024

LIM 2222: Aquatic Toxicology and Human Health Risk

Time: 1 hour and 30 minutes

Answer all (03) questions

1.

- 1.1 Differentiate the terms 'Apoptosis' and 'Necrosis'.
- 1.2 What is 'Teratogenesis'?
- 1.3 Differentiate the terms 'Bioaccumulation' and 'Biomagnification'.

**(25 minutes, 25
Marks)**

2.

- 2.1 Describe the uses of biomarkers in evaluating the exposure of toxicants on macroinvertebrates.
- 2.2 Provide reasons for malfunctioning of the detoxification process in macroinvertebrates.

**(30 minutes, 25
marks)**

3. The concentration of a pesticide in a reservoir was recorded as $0.04 \pm 0.001 \mu\text{g/L}$ (Mean $\pm$ SD). A five-day toxicity test was carried out using *Hydrilla verticillata* as the testing plant. The test was conducted in six glass tanks filled with 5L of different concentrations of the pesticide. Ten similar length *Hydrilla verticillata* shoots with 12 leaves were introduced into each concentration. The observations made for each day were recorded in Table 1. Using the given information in Table 1,
- i) Evaluate the toxicity of the pesticide on *Hydrilla verticillata*.
 - ii) Estimate the environmental risk of the pesticide.
 - iii) Describe the factors to be considered for the environmental bioavailability of the pesticide.

Table 1: Observations of the experiment

Concentration ($\mu\text{g/L}$)	Number of fallen leaves in the experimental tanks					Number of leaves with discolored patches				
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 1	Day 2	Day 3	Day 4	Day 5
0.000	0	0	0	0	0	0	0	0	0	0
0.100	0	0	0	08	12	02	04	04	04	05
0.150	08	12	14	16	25	02	03	05	06	12
0.200	10	14	15	17	30	02	03	04	05	14
0.250	12	13	15	18	38	02	03	03	04	06
0.300	13	14	17	18	44	02	02	02	03	05

*Note: The following table would be useful for answering the question.

%	0	1	2	3	4	5	6	7	8	9
0		2.67	2.95	3.12	3.25	3.36	3.45	3.52	3.59	3.66
10	3.72	3.77	3.82	3.87	3.92	3.96	4.01	4.05	4.08	4.12
20	4.16	4.19	4.23	4.26	4.29	4.33	4.36	4.39	4.42	4.45
30	4.48	4.50	4.53	4.56	4.59	4.61	4.64	4.67	4.69	4.72
40	4.75	4.77	4.80	4.82	4.85	4.87	4.90	4.92	4.95	4.97
50	5.00	5.03	5.05	5.08	5.10	5.13	5.15	5.18	5.20	5.23
60	5.25	5.28	5.31	5.33	5.36	5.39	5.41	5.44	5.47	5.50
70	5.52	5.55	5.58	5.61	5.64	5.67	5.71	5.74	5.77	5.81
80	5.84	5.88	5.92	5.95	5.99	6.04	6.08	6.13	6.18	6.23
90	6.28	6.34	6.41	6.48	6.55	6.64	6.75	6.88	7.05	7.33
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
99	7.33	7.37	7.41	7.46	7.51	7.58	7.65	7.75	7.88	8.09

Probit regression according to EP17-A2

(35 minutes, 35

Marks)

Continuous Assessment: 15 Marks