BANGLADESH UNIVERSITY OF PROFESSIONALS
Military Institute of Science and Technology
B.Sc. in Environmental, Water Resources, and Coastal Engineering
Level-1, Term-I, Final Examination: June 2016

Subject: EWC 121: Ecology, Environmental Pollution and Management

Time: 3.00 hours **Full Marks: 210**

INSTRUCTIONS:

a. Use **SEPARATE** answer scripts for each section.
b. Answer any **THREE** questions from each section.
c. Figures in the margin indicate full **marks**.
d. Assume reasonable data if necessary.
e. **Symbols** used have their usual meanings.

SECTION-A

Question – 1

a. Define environment. How does environment get polluted? 10

b. Briefly discuss about the causes of water pollution in any river. 10

c. Calculate the BOD of a reference sample given that 1 ml of seed material was used in that sample. Consider that 300 ml BOD bottles were used. 15

	Seed material	Reference sample
Volume used	9 ml	5 ml
Initial DO	8.7 mg/l	8.6 mg/l
Final DO	5.1 mg/l	5.0 mg/l

Question – 2

a. How does eutrophication occur in any lake? How will you control eutrophication problem? 12

b. Explain the importance of wetland in protecting water pollution. 10

c. For any lake water, following water quality parameters were tested and the results are listed here as below: 13

parameter	unit	Result	Q- value
DO	%	95	98
pH		8	88
E.coli	CFU/100ml	1750	23
Temp	°C	0	100
Turbidity	NTU	10	79
NO_3	Mg/l	0.4	91
BOD	Mg/l	6	36

Consider the water quality index range and corresponding rating as follows:

Water quality index range	Water quality rating
80-100	Excellent
70-79	Good
50-69	Medium
25-49	Bad
0-24	Very bad

Calculate the WQI of the lake. (assume missing parameters weight factor if these are required)

Question – 3

a. How does soil pollution occur? Mention the adverse effects of soil pollution. 13

b. Briefly describe about the causes and effects of air pollution. 10

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c. Write an explanatory note climate change and possible adaptation techniques.

Question – 4

a. A worker in a machine shop is exposed to 95 dBa for 3 hours, 69 to 78 dBa for 3 hours (including a 15 minutes break and 45 minute lunch) and 90 dBa for 3 additional hours:

Permissible duration (hours/day)	Sound level (dBa, slow response)
16	85
8	90
4	95
2	100

Check the worker's noise exposure situation.

b. Briefly discuss the importance of pesticides on agricultural productivity and its adverse effect on environment.

c. Write explanatory notes on the following:
   i) detergent pollution
   ii) Thermal pollution
   iii) Universal soil loss equation

SECTION-B

Question – 5

a. Define: i) ecological footprint and ii) Bio-capacity. For two ecosystem A and B following data are given:

Tree species	No of individuals in ecosystem	
	A	B
Maple	10	10
Walnut	7	10
Palm tree	20	10
poplar	3	10

Determine for each of the ecosystem: species richness, simpson's index and Shannon-weinar index. Also compare the ecosystem A and B based on the results.

b. Explain how behavioral adaptation mechanisms of different species act as a means of their natural selection.

Question – 6

a. Briefly explain the "rule of 10" in an ecological pyramid. Applying this rule, draw a typical biomass pyramid schematically showing different trophic levels for a terrestrial ecosystem.

b. How human activities affect the carbon cycle? Explain.

c. What are the short term and long term human health effects due to fossil fuel burning? Why coal burning is of more concern from pollution point of view, compared to other fossil fuels.

Question – 7

a. Explain how adverse effects of pollutant on ecological level can act as an early warning indicator for potential human health impacts. Consider pesticide as the pollutant and an aquatic ecosystem for the explanation.

b. Describe how textile dying industries are degrading surface water quality in Bangladesh.

c. Draw the typical pathway of heavy metal contamination.

Question – 8

a. Write the sources and health effects of arsenic and lead. What is phytoremediation and how it can be used for pollution control due to heavy metal contamination? 10

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b. Describe the adverse impacts of – (i) fertilizer and (ii) prescribed drugs on environment. How pharmaceutical footprint can be reduced? Explain. 10+5

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