BANGLADESH
Military Institute of Science and Technology
B.Sc. In Environmental, Water Resources, and Coastal Engineering
Level-1, Term-I Final Examination:May-Jun 2017

Subject: EWC-131, Ecology, Environmental Pollution and Management

Full Marks: 210

Time: 3.00 hours

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" and "Pollutant". How does environment get polluted? 07

b. Briefly discuss about "Eco-system Model". 10

c. Discuss about potential adaptation measure to combat climate change effect. 08

d. Distinguish between surface run-off and infiltration. 05

e. Explain water cycle. 05

Question – 2

a. Explain the different sources of water pollution. 07

b. Narrate the effect of agrochemicals on environment. 05

c. How does eutrophication occur? How will you control eutrophication? 08

d. Suggest possible measures to control surface water as well as groundwater. 07

e. Calculate the BOD of a reference sample given that 2 ml of seed material was used in the reference sample. (300 ml BOD bottles were used). 08

	Seed Material	Reference Sample
Volume Used	9.3mL	5.3 mL
Initial DO	8.5	8.2
Final DO	5.0	4.6

Question – 3

a. How does water get enriched with dissolved oxygen? Mention the importance of DO in aquatic environment? 07

b. How does air pollution occur? What are the adverse effects of air pollution on public health? 07

c. Describe briefly about the sources of industrial smog and photo-chemical smog? 06

d. How will you control air pollution, noise pollution and heat pollution? 10

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e. Given, five machines producing 105 dB, 94 dB, 85 dB and 78 dB respectively. What is the total sound pressure level?

Question – 4

a. Define soil pollution. Explain the causes of soil pollution. What are the adverse effects of soil pollution?

b. Discuss the methods for measuring soil water content. What is the importance of soil moisture on agriculture?

c. A soil is sampled by a cylinder measuring 7.8 cm in diameter and 7.8 cm length. Calculate the gravimetric and volumetric water contents, wet and dry bulk densities using the following data:

i. Weight of empty cylinder= 305 gm
ii. Weight of cylinder and wet soil= 1050 gm
iii. Weight of cylinder and oven dry (105^0 c) soil= 870 gm

d. Discuss about microwave remote sensing in measuring soil moisture.

e. Write down the comprehensive prevention method of soil pollution control.

SECTION-B

Question 5

a. How inherited variations differ from natural selection of the species? Explain with examples, how structural adaptation mechanisms of different species act as the means of their natural selection. 5+10=

b. Briefly discuss about- 3+3=
i. Pyramid of numbers
ii. Pyramid of biomass

c. How human activities alter the hydrological cycle? Briefly explain the nitrogen fixation, nitrification and denitrification processes in the nitrogen cycle. 5+9=

Question 6

a. Describe the ecological levels of organization with appropriate example. Briefly explain the significance of ecological footprint from the perspective of biocapacity. 8+6=

b. Explain the influences of – (i) pollution and (ii) invasive species on biodiversity loss. 3+3=

c. Determine the Margalef's Index, the simpson's Index and the Shannon-Weinar Index for each of the aquatic ecosystms mentioned in the following Table. Also compare the ecosystems based on the results.

Fish species	No of individuals		
	Ecosystem-X	Ecosystem-Y	Ecosystem-Z
Mrigal	8	9	5
Rohu	9	12	10
Chitala	18	8	15
Catla	5	11	20

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Question 7

a. Write the significance of the following soil properties. **3x5=15**

i. Water holding capacity.
ii. Organic matter content
iii. Cation exchange capacity.

b. What are the environmental impacts of water containing (i) color, (ii) turbidity, (iii) hardness, (iv) iron and (v) arsenic? **5x2=10**

c. Explain the factors affecting the toxicity of pesticides used in agricultural activities. **10**

Question 8

a. Discuss the adverse effects of- (i) textile dye and (ii) detergent on aquatic system. **5+5=10**

b. How pharmaceutical wastes are released to the environment? What measures can be taken to reduce the amount of phramaceutical wastes? **4+6=10**

c. Mention the typical pathways of arsenic contamination. Briefly explain the phytoremediation approaches for heavy metal management. **5+10=15**

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