BANGLADESH UNIVERSITY OF PROFESSIONALS
Military Institute of Science and Technology
B.Sc. in Environmental, Water Resources, and Coastal Engineering
Student Group: 0 < Earned Credit Hour <= 36, Spring Final Examination: June 2019

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

Time: 3.00 hours **Full Marks: 180**

INSTRUCTIONS:

a. Use **SEPARATE** answer scripts for each section.
b. **Question- 1 in Section A** and **Question-5 in Section B** are compulsory.
c. Answer **any OTHER TWO** questions **from each section.**
d. Figures in the margin indicate **full marks.**
e. Assume reasonable data if necessary.
f. **Symbols** used have their usual meanings.

SECTION-A

Question – 1

a. Classify and explain different types of Environmental pollution. **10**

b. Define DO, BOD and COD. Explain briefly the importance of DO in aquatic environment. **10**

c. List the causes of eutrophication. Discuss the role of a septic tank in minimizing eutrophication of a lake. **10**

d. Calculate the BOD_5 of a reference sample given that 1 ml of seed material was used in that sample. Consider that 300ml BOD bottles were used. **10**

	Seed material	Reference sample
Volume used	9.1 ml	5.2 ml
Initial DO_0	8.6 mg/L	8.3 mg/L
Final DO_5	4.9 mg/L	4.8 mg/L

Question – 2

a. Define 'Eco-system'. Explain briefly 'Eco-system Model'. **7**

b. Discuss the role of a wetland in preserving aquatic 'Eco-system'. **8**

c. For any lake, following water quality parameters were tested and the results are tabulated as follows: **10**

Parameter	Unit	Result	Q-value
DO	%	94	97
pH	-	7.8	87
E. Coli	CFU/100 ml	1650	21
Temp.	°C	0	100
Turbidity	NTU	9.5	77
NO_3	mg/L	0.3	90
BOD_5	mg/L	5.5	34

Calculate the WQI and rate the water quality. Assume missing parameters' weight factor if these are required.

Question – 3

a. Discuss briefly the soil formation process. Show a typical vertical soil profile and explain its different parts. Suggest suitable measures to mitigate soil pollution. **10**

b. A soil is sampled by a cylinder assuming 7.6 cm in diameter and 7.8 cm length. Calculate the gravimetric and volumetric water **8**

Scanned with CamScanner

contents, wet and dry bulk densities using the following data:

(i) weight of empty cylinder = 295 gm
(ii) weight of cylinder and wet soil = 1000 gm
(iii) weight of cylinder and oven dry (105°C) soil = 850 gm

c. Explain the causes of thermal pollution. Suggest corrective measures to control marine pollution. 7

Question – 4

a. Discuss briefly about the sources of industrial smog and photo-chemical smog. Distinguish between primary and secondary air pollutants. 6

b. Narrate the effect of agrochemicals on environment. Discuss the adverse impacts of pesticide, detergents on environment. 6

c. Explain possible adaptation techniques to combat climate change. 6

d. 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 minutes 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.

SECTION-B

Question – 5

a. Define ecology. 5

b. What are the basic components of ecosystem? Write a short note on concept of sustainability. 10

c. Explain the key features of ecological pyramids. Discuss the function of an ecosystem with respect to energy. 10

d. Discuss the impacts of urbanization on ecosystems. 5

Question – 6

a. Briefly explain terms ecosystem biodiversity, species biodiversity and genetic biodiversity. 9

b. Calculate the Simpson's diversity index for the following ecosystems given in the following table. 10

	Number of Individuals	
Species	Tropical Ecosystem	Arctic Ecosystem
A	12	19
B	3	1
C	7	2

Scanned with CamScanner

Interpret the calculated values with respect to biodiversity of the ecosystems.

c. What is habitat loss and how is it affecting life on earth today? 6

d. Describe the value of biodiversity in maintaining the biogeochemical cycles. 5

Question – 7

a. Why is an understanding of biogeochemical cycles important in environmental engineering? Explain your answer, using at least one example.. 8

b. Explain sulphur cycle with the help of a diagram. 12

c. Discuss acid rain and explain its effects on environment. 10

Question – 8

a. Discuss the environmental management strategies required for the sustainable development of environment. 10

b. Explain the role of environmental laws in environmental protection. 8

c. What are the sources and effects of air pollution in Bangladesh? Explain possible air poilution minimization techniques. 12

Scanned with CamScanner