



Khulna University

School: Life Science

Discipline: Soil, Water and Environment

Program: BSc (Hons)

Year: First

Term: First

Examination Year: 2026

Session: 2025-2026

Course Code: 0888 13 SWE 1111

Course Title: **Introductory Soil Science**

Total Marks: 60

Time: 03 hours

Credit: 3.0

Instructions (if any):

* The figures in the margin indicate full marks. The questions are of equal value.

* Use a separate sheet for each section.

* Special instructions: Parts of each question must be answered consecutively.

Section A

[There are 04 (four) questions in this section. Answer any 03 (three) questions.]

Q. No.	Question Description	Marks
1(a)	Define soil according to Kellogg. [L1; CLO1]	02
(b)	Describe nutrients and temperature as the plant growth factors. [L3; CLO1]	04
(c)	Draw and describe the flower diagram of soil farming factors. [L3; CLO2]	04
2(a)	What do you mean by hydration and hydrolysis? [L1; CLO2]	02
(b)	Narrate the physical weathering processes of soil formation. [L3; CLO2]	05
(c)	Distinguish between sedimentary and metamorphic rocks. [L1; CLO2]	03
3(a)	What do you mean by soil horizons? [L1; CLO2]	02
(b)	Illustrate an ideal soil profile with a diagram. [L2; CLO2]	05
(c)	Describe moisture as a factor of soil formation. [L3; CLO2]	03
4(a)	Establish soil as the best medium for plant growth. [L5; CLO3]	04
(b)	What do you mean by a mature and immature soil profile? [L1; CLO2]	02
(d)	Describe the volume composition of an ideal soil. [L2; CLO3]	04

**Section B**

There are 04 (four) questions in this section. Answer any three (03) questions.

Q. No.	Question Description	Marks
5(a)	Outline the importance of soil porosity. [L2; CLO3]	04
(b)	Explain the various aspects of soil bulk density. [L4; CLO3]	03
(c)	Illustrate the various types of soil structures. [L2; CLO3]	03
6(a)	Interpret the reasons behind the variation in organic matter decomposition in soil. [L3; CLO3]	3
(b)	Identify the components of soil color notation. [L3; CLO3]	3
(c)	Determine the importance of soil pH on soil microbial activity. [L4; CLO3]	4
7(a)	“Soil colloids adsorb both nutrients and water for plant growth.” Justify. [L4; CLO3]	3
(b)	Describe the Atterberg limits. [L3; CLO3]	4
(c)	Evaluate the organism diversity in soil. [L5; CLO3]	3
8	Write short notes on the following	2.5×4=10
(a)	Ecosystem services of soil [L4; CLO3]	
(b)	Marshall's triangular coordinate [L3; CLO3]	
(c)	Soil separates [L2; CLO3]	
(d)	Soil salinity [L4; CLO3]	

[Question of Term Final Examination]



Khulna University

School: Life Science	Discipline: Soil, Water and Environment	Program: BSc (Hons)
Year: First	Term: First	Examination Year: 2026
Course Code: 0888 13 SWE 1121	Course Title: Introductory Hydrology	Session: 2025-2026
Total Marks: 60	Time: 03 hours	Credit: 3.0

Instructions (if any):

- * The figures in the margin indicate full marks. The questions are of equal value.
- * Use a separate sheet for each section.
- * Special instructions: Parts of each question must be answered consecutively.

Section A

[There are 04 (four) questions in this section. Answer any 03 (three) questions.]

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Q. No.	Question Description	Marks																											
1(a)	Draw a diagram showing the water inventory on Earth. [L1, CLO1]	02																											
(b)	Explain the stages of the hydrologic cycle. [L2, CLO1]	06																											
(c)	Why is hydrology study considered important for people and their environment? [L3, CLO1]	02																											
2(a)	Outline the basic data required for designing a hydrologic project. [L1, CLO2]	03																											
(b)	Draw the relevant diagrams to explain that varying climate influences hydrologic processes. [L2, CLO2]	02																											
(c)	Give the basic hydrologic budget equation and explain it. [L2, CLO2]	02																											
(d)	How can studying hydrology help with flood management, water yield, groundwater development, and drainage of a basin? [L4, CLO2]	03																											
3(a)	Draw a hydrograph, label its components, and explain them. [L2, CLO2]	04																											
(b)	How can you estimate the residence time of water in the ocean? Consider that $M = 1,37,000 \times 10^3 \text{ km}^3$. [L3, CLO2]	02																											
(c)	Draw and compare two typical hydrographs for watersheds of equal size: one representing an urban catchment and the other a rural catchment. Mark the differences between the two hydrographs and explain the reasons behind these differences. [L4, CLO2]	04																											
4(a)	Explain why the Thiessen polygon method gives a better estimation of the annual average precipitation of a given area. [L2, CLO2]	03																											
(b)	Suppose rain gauge station D was inoperative for part of a month during which a storm occurred. The storm rainfall recorded in the three surrounding stations A, B, and C was 8.5, 6.7, and 9.0 cm, respectively. If the a.a.r for the stations are 75, 84, 70, and 90 cm, respectively, estimate the storm rainfall at station D. [L3, CLO2]	03																											
(c)	A catchment has 8 gauging stations. The precipitation and corresponding Thiessen polygon areas (km^2) are given below. Compute the average precipitation over the basin. [L3, CLO2]	04																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Stations</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>H</th> </tr> </thead> <tbody> <tr> <td>Precipitations (cm)</td> <td>9.3</td> <td>10.5</td> <td>10.9</td> <td>12.2</td> <td>13.5</td> <td>14.0</td> <td>14.2</td> <td>12.8</td> </tr> <tr> <td>Area (km^2)</td> <td>172</td> <td>164</td> <td>156</td> <td>150</td> <td>116</td> <td>36</td> <td>124</td> <td>42</td> </tr> </tbody> </table>	Stations	A	B	C	D	E	F	G	H	Precipitations (cm)	9.3	10.5	10.9	12.2	13.5	14.0	14.2	12.8	Area (km^2)	172	164	156	150	116	36	124	42		
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Section B

There are 04 (four) questions in this section. Answer any three (03) questions.

Q. No.	Question Description	Marks
5(a)	Define groundwater and explain its importance. [L1, L2; CLO3]	1+1
(b)	State the groundwater balance equation and identify what each variable represents. [L1; CLO3]	1+1
(c)	In your opinion, is public awareness more effective in managing groundwater conservation? Justify your answer using the concept of over-extraction. [L3; CLO3]	4
(d)	Calculate the change in storage if an aquifer receives 500 units of rain and 100 units of canal seepage, while 450 units are pumped out and 150 units discharge into a river. [L4; CLO3]	2
6(a)	How can Darcy's law be used to estimate the flow rate of water through a sandy aquifer? [L1; CLO1]	3
(b)	Distinguish between specific yield and specific retention. [L3; CLO1]	2
(c)	Two hypothetical reservoirs are connected by a subsurface permeable stratum. Using the provided data (cross-sectional area $A = 100 \text{ m}^2$, head loss $\Delta h = 35 \text{ m}$, length of flow path $\Delta L = 1500 \text{ m}$, hydraulic conductivity $K = 7.5 \times 10^{-4} \text{ m/s}$, and porosity of porous medium $n = 0.45$), determine the superficial and true pore velocities of flow through the porous medium, as well as the time of flow from the upper to the lower reservoir. [L4; CLO1]	2+1+2
7(a)	Describe the main characteristics of the soil-water zone. [L1; CLO2]	4
(b)	Explain the differences between an aquiclude and an aquitard. [L2; CLO2]	2
(c)	What makes a groundwater well go dry? Explain. [L3; CLO2]	2
(d)	What is an artesian well, and why can water sometimes rise above the ground surface without a pump? [L1,L2; CLO2]	1+1
8(a)	List the primary constituents that contribute to groundwater contamination. [L1; CLO3]	1
(b)	Describe the process of saline water intrusion into groundwater systems. [L2; CLO3]	3
(c)	How does salinity affect groundwater quality? [L2; CLO3]	3
(d)	Analyze the impact of human activities on groundwater quality. [L4; CLO3]	3

[Question of Term Final Examination]



Khulna University

School: Life Science

Discipline: Soil, Water and Environment

Program: BSc (Hons)

Year: First

Term: First

Examination Year: 2026

Session: 2025-2026

Course Code: **0888 13 SWE 1131**

Course Title: **Introductory Environmental Science**

Total Marks: 60

Time: 03 hours

Credit: 3.0

Instructions (if any):

* The figures in the margin indicate full marks. The questions are of equal value.

* Use a separate sheet for each section.

* Special instructions: Parts of each question must be answered consecutively.

Section A

[There are 04 (four) questions in this section. Answer any 03 (three) questions.]

Q. No.	Question Description	Marks
1(a)	Discuss the functions of the ecosystem. [L1; CLO1]	03
(b)	Which is more desirable, a simple or a complex food web? Justify your answer. [L2; CLO1]	02
(c)	Describe the ecological succession. [L3; CLO1]	02
(d)	Explain the principles of sustainability. [L4; CLO1]	03
2(a)	Draw the cross-section of the Earth and describe the core. [L2; CLO1]	03
(b)	Break down the mineralogical and chemical composition of the Earth's crust. [L4; CLO1]	03
(c)	Explain the mechanism behind the opposing behavior of cyclones in both hemispheres with figures. [L5; CLO1]	04
3(a)	Explain 'Albedo'. [L2; CLO1]	02
(b)	Analyze the characteristics of Savannas. [L2; CLO1]	02
(c)	Which factors influence the type of terrestrial ecosystem? How are the biomes spread around the world? [L4; CLO1]	01+01=02
(d)	Compare Tropical and Temperate rainforests. [L4; CLO1]	04
4(a)	What is meant by interactions between organisms and their environment? [L1, CLO1]	02
(b)	Describe the mechanisms of prey's defense against a predator. [L2, CLO1]	04
(d)	Evaluate the importance of ecological balance in environmental interactions. [L2, CLO1]	04



Section B

There are 04 (four) questions in this section. Answer any three (03) questions.

Q. No.	Question Description	Marks
5(a)	Define environmental ethics. [L1; CLO3]	02
(b)	Write down the objectives of environmental ethics. [L1; CLO3]	03
(c)	Explain the environmental ethics framework. [L2; CLO3]	05
6(a)	What are the major greenhouse gases in the atmosphere responsible for global warming? [L1, CLO 4]	02
(b)	Illustrate the climate change impact chain in soil, water, and the environment. [L2, CLO4]	05
(c)	Discuss the link between global warming and sea-level rise. [L2, CLO4]	03
7(a)	Describe the greenhouse effect and its impact on the Earth's atmosphere. [L2, CLO4]	05
(b)	Suggest the top three sustainable strategies for alleviating global warming. [L2, CLO4]	05
8(a)	What are the key processes involved in identifying environmental issues? [L1, CLO4]	02
(b)	Draw a schematic flow diagram of the atmospheric environmental framework. [L2, CLO4]	04
(c)	Explain the climate change impact on Bangladesh. [L2, CLO4]	04



Khulna University

School: Life Science

Discipline: Soil, Water and Environment

Program: BSc (Hons)

Year: First

Term: First

Examination Year: 2026

Session: 2025-2026

Course Code: 0531 13 Chem 1151

Course Title: Chemistry

Total Marks: 60

Time: 03 hours

Credit: 3.0

Instructions (if any):

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Section A

[There are 04 (four) questions in this section. Answer any 03 (three) questions.]

Q. No.	Question Description	Marks
1(a)	Distinguish between homogeneous and heterogeneous mixtures. [L2; CLO1]	03
(b)	Explain the interconversion of different states of matter. [L2; CLO1]	03
(c)	Evaluate the significance of Bohr's atomic model. [L5; CLO1]	04
2(a)	Explain the formation of Al_2Cl_6 . [L3; CLO1]	03
(b)	Analyze the differences between ionic and covalent bonds. [L4; CLO1]	03
(c)	Metals are ductile and malleable – justify the statement. [L5; CLO1]	04
3(a)	In a titration experiment, a student finds that 23.48 mL of a NaOH solution is needed to neutralize 0.5468 g of potassium hydrogen phthalate. What is the concentration (in molarity) of the NaOH solution? [L3; CLO2]	05
(b)	When a Zn rod is immersed in a blue solution of $CuSO_4$, the solution gradually becomes colorless. Explain the underlying chemistry of this process. [L4; CLO2]	05
4(a)	Derive the Beer-Lambert law, $A = \epsilon cl$, where the symbols have their usual meanings. [L3; CLO2]	05
(b)	Design a spectroscopic method for determining the concentration of textile dyes in wastewater. [L6; CLO2]	05



Section B

There are 04 (four) questions in this section. Answer any three (03) questions.

Q. No.	Question Description	Marks
5(a)	<p>Consider the following reaction:</p> $NaCl \rightleftharpoons Na^+ + Cl^-$ <p>What happens when (Shortly give some logic for each question):</p> <ul style="list-style-type: none"> (i) Some NaCl is added (ii) The solution is diluted by adding water (iii) Some Cl^- ion is added <p style="text-align: right;">[L2; CLO3]</p>	05
(b)	<p>Consider the non-elementary reaction $A+2B \xrightarrow{K} D+P$, which can be written stepwise as follows:</p> $A+B \xrightarrow{K_1} C+D$ $C+B \xrightarrow{K_2} P$ <p>Show that the equilibrium constant can be written as $K=K_1K_2$ [L4; CLO3]</p>	05
6(a)	Explain the buffer effect of both acidic and basic buffers with an example. [L2; CLO3]	05
(b)	Calculate the rate constant for a first-order reaction if 68% of a substance is reacted within 66 s. The initial concentration of the substrate was 0.1M. [L6; CLO3]	05
7(a)	The change in Gibbs energy that accompanies the oxidation of $C_6H_{12}O_6$ to carbon dioxide and water vapour at $25^\circ C$ is $-2828 \text{ kJ mol}^{-1}$. How much glucose does a person of mass 70 kg need to consume to climb through 15 m? [L6; CLO1]	05
(b)	<p>Explain the variation of percentage of the obtained products in the following reaction: [L2; CLO3]</p> <div style="text-align: center;"> <p style="text-align: center;"> $CH_3(CH_2)_{14}Br \xrightarrow[CH_3OH, 65^\circ C]{CH_3ONa} CH_3(CH_2)_{13}CH=CH_2 + CH_3(CH_2)_{14}OCH_3$ </p> <p style="text-align: center;"> E2 S_N2 (1%) (99%) </p> </div>	05
8(a)	Discuss the Lucas Test for identifying primary, secondary, and tertiary Alcohols. [L2; CLO3]	05
(b)	Explain the elimination reaction in the E2 mechanism with an example. [L3; CLO3]	05

[Question of Term Final Examination]



Khulna University

School: Life Science	Discipline: Soil, Water and Environment	Program: BSc (Hons)
Year: First	Term: First	Examination Year: 2026
Course Code: 0231 13 Eng 1155	Course Title: Communicative English	
Total Marks: 60	Time: 03 hours	Credit: 3.0

Instructions (if any):

- * The figures in the margin indicate full marks. The questions are of equal value.
- * Use a separate sheet for each section.
- * Special instructions: Parts of each question must be answered consecutively.

Section A

[There are 04 (four) questions in this section. Answer any 03 (three) questions.]

Q. No.	Question Description	Marks
1(a)	Form W/H questions targeting the underlined sections: i) <u>The CEO's sudden resignation</u> caused the stock prices to drop. ii) She had to solve the problem by <u>recalibrating the entire system</u> . iii) The documentary focuses <u>on the impact of microplastics</u> in the ocean. iv) They have been waiting for the manager for <u>two hours</u> . v) This umbrella belongs to <u>the girl</u> sitting in the corner. [L3; CLO3]	05
(b)	Transform the following sentences as directed: i) As the cat stretched itself, it crawled into a comfortable position on the couch. (simple) ii) My bike was out of petrol, so I had to go to the nearest petrol station (complex) iii) The train was late, yet Preetha waited for the train. (simple) iv) Having handed over the flowers to my mom, I hugged her. (compound) v) It is so soon that the outcome cannot be determined (simple) [L2; CLO3]	05
2(a)	Change the words according to the directions and make sentences with: i) Agriculture (adjective) ii) Satisfy (noun) iii) Efficient (adverb) iv) Courage (verb) v) Silent (noun) [L2; CLO2]	5×1=5
(b)	Choose the correct answers in parentheses and write the correct sentence. i) Each of the participants (is, are) required to submit the report by tomorrow. ii) The team, as well as the coach, (is, are) traveling to Dhaka for the tournament. iii) Neither the students nor the teacher (knows, know) where the keys are kept. iv) Ten kilometers (is, are) too far to walk in this heat. v) A number of books (has, have) been donated to the library. [L6; CLO2]	5×1=5
3	Explain the in-class and post-class benefits of note-taking. [L5; CLO2]	10
4	Write short notes on the following [L3; CLO3] (a) Scanning as a reading strategy (b) Coherence and Cohesion	5×2=10



Section B

There are 04 (four) questions in this section. Answer any three (03) questions.

Q. No.	Question Description	Marks
5	Elaborate on how a public speaker can successfully establish rapport with their audience. [L6; CLO2]	10
6(a)	Rewrite the following sentences after correcting the punctuation errors: i) Are you coming with us he asked. ii) You should bring your hiking boots otherwise your feet will get blistered. iii) For breakfast I had coffee toast and fruit and for lunch I had a salad. iv) I'll be home late she said don't wait up for me. v) You have two choices stay here or come with us. [L3; CLO2]	5
(b)	Discuss the importance of peer review in academic writing. [L4; CLO2]	5
7	Write a paragraph on "Artificial Intelligence". [L6; CLO2]	10
8	Compose a corporate curriculum vitae. [L2; CLO3]	10