



[Question of Term Final Examination]
Khulna University

School: Life Science Discipline: Biotechnology and Genetic Engineering Program: Bachelor
Year: 1st Term: 2nd Examination Year: 2026 Session: 2024-25
Course Code: 0512 07 BGE 1201 Course Title: Microbiology
Total Marks: 60 Time: 3 Hours Credit: 3.0

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate script for each section.

Section-A

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

Question no.	Question Description	Marks
1. (a)	Define microbiology and enlist major types of microorganisms with examples. [L (1, 4); CLO 1]	02
(b)	Outline Koch's postulates and their function in investigating disease causation. [L (2), CLO 1]	04
(c)	Microbiology plays a vital role in improving human life and environmental sustainability. Justify the statement with appropriate examples. [L 5, CLO 1]	04
2. (a)	How do viroids and prions differ from viruses? [L 2; CLO 2]	02
(b)	Provide a list of prion-induced diseases and elucidate their distinctive features. [L (1, 4); CLO 4]	04
(c)	Write the characteristics of <i>mycoplasma</i> and <i>actinomyces</i> . [L 1; CLO 2]	04
3. (a)	Mention the causative microorganism of syphilis and describe the public health measures used to prevent its transmission. [L 5, CLO (5, 6)]	04
(b)	State the pros and cons of using embryonated eggs and cell culture for virus growth. [L 4, CLO 4]	04
(c)	What are the principal routes by which viruses infect humans? [L 1, CLO (4, 5)]	02

4. (a) Why do some gram-positive bacteria form endospores during environmental stress? Discuss the process briefly. [L (1, 6), CLO 4] 04
- (b) Describe the means by which genetic variation is created in the bacteria. [L4, CLO 2] 04
- (c) Why is *Mycoplasma pneumoniae* infection referred to as walking pneumonia? [L 1, CLO (4, 5)] 02

Section-B

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

Question no.	Question Description	Marks
5. (a)	Define binary fission. Describe the major steps involved in bacterial cell division with suitable diagrams. [L 2, CLO 2]	04
(b)	Discuss the role of concentration in microbial growth. Explain halophiles, halotolerant microorganisms and xerophiles. [L (1, 3); CLO 1]	04
(c)	Discuss the characteristics and importance of selective and differential media. [L 1, CLO 2]	02
6. (a)	Define lyophilization. Describe the effects of ultraviolet and ionizing radiation on microorganisms. [L (1, 4); CLO 5]	04
(b)	List the factors to take into account when choosing a chemical control agent. [L 1; CLO 5]	04
(c)	Describe the antimicrobial mechanisms of halogens. [L (1, 2); CLO 2]	02
7. (a)	Name the causative agent of measles. Explain the structure and biological characteristics of the measles virus. [L5; CLO 4]	05
(b)	Explain why opportunistic infections mainly target individuals with weakened immune systems. [L 2; CLO5]	03
(c)	Discuss the impact of misuse and overuse of antibiotics on public health. [L 2; CLO 5]	02
8. (a)	Compare Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) with suitable examples. [L (1, 2); CLO 6]	02
(b)	Describe the role of microbes in food and beverage production. [L 4, CLO 6]	04
(c)	Explain how microorganism can be used in biotechnology to reduce environmental pollution. [L 5, CLO 6]	04



[Question of Term Final Examination]
Khulna University

School: Life Science	Discipline: Biotechnology and Genetic Engineering	Program: Bachelor
Year: 1 st	Term: 2 nd	Examination Year: 2026
Course Code: 0512 07 BGE 1203		Session: 2024-25
Total Marks: 60	Time: 3 Hours	Course Title: Principles of Genetics
		Credit: 3.0

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate script for each section.

Section-A

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

Question no.	Question Description	Marks
1. (a)	What do you understand by the term genetics, heredity, gene and genomics? Give three examples of heredity. [L 2; CLO 1]	2.5
(b)	What do you know about “genetic material”? What criteria must be met for a biomolecule to be considered genetic material? [L (1, 2), CLO 1]	2.5
(c)	Why is studying “Principles of Genetics” important for societal development and human welfare? Elucidate. [L 3, CLO 1]	05
2. (a)	Interpret the terms- “transmission, transformation and transduction”. Elucidate Griffith’s transformation experiment conducted on mice and mention its conclusion. [L 5; CLO 1]	04
(b)	How can you prove that DNA is responsible for the transformation of the avirulent strain IIR into the virulent strain IIIS of <i>Diplococcus pneumoniae</i> ? [L 5; CLO 1]	03
(c)	How phenotype of an organism is determined? Explain it. [L 4; CLO 1]	03
3. (a)	Elucidate mendel’s monohybrid cross experiment with its observations. [L 2, CLO 2]	4.5
(b)	Compare and contrast between dominance and co-dominance phenomena with examples. [L 4, CLO 2]	03
(c)	What are the criteria of extra-chromosomal inheritance? Evaluate the practical importance of maternal inheritance. [L (2, 5), CLO 2]	2.5

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| 4. | (a) | Summarize the characteristics of multiple alleles and polygene. Interpret the influence of environmental factors on the expression of polygene as well as performance of animal, plant and human. [L (2, 5), CLO 2] | 03 |
| | (b) | What do you know about heterosis? How can you utilize the heterosis theory to ensure food and feed security in Bangladesh? Explain. [L(2, 3), CLO 2] | 03 |
| | (c) | Mention various forms of inbreeding in animals and plants. Interpret the causes and consequences of consanguineous marriage in our society. [L 5, CLO 2] | 2.5 |
| | (d) | What can you able to do after successful completion of this course? Describe in brief. [L 5; CLO 3] | 1.5 |

Section-B

- | Question no. | Question Description | Marks |
|---|---|-------|
| There are four (04) questions in this section. Answer any three (03) questions. | | |
| 5. | (a) Define and classify crossing over in genetics. [L (1, 4), CLO (1, 2)] | 04 |
| | (b) Describe the theories and mechanisms of crossing over. [L (1, 5); CLO (1, 2)] | 06 |
| 6. | (a) Define linkage in genetics. Describe autosomal and allosomal linkage with suitable examples. [L (1, 5); CLO (2, 4)] | 06 |
| | (b) Describe the process of fingerprint mapping of a chromosome. [L (1, 3); CLO 3] | 04 |
| 7. | (a) Write the causes of the following:
<div style="margin-left: 20px;"> (i) Wolf-Hirschhorn syndrome
 (ii) Jacobsen syndrome
 (iii) Charcot-Marie-Tooth disease Type 1A syndrome and
 (iv) Down Syndrome
 [L(1, 6); CLO (3, 5)] </div> | 02 |
| | (b) Describe the numerical changes in chromosomes. [L (1, 4); CLO3] | 05 |
| | (c) Describe the application of polyploidy in crop improvement. [L 2; CLO 4] | 03 |
| 8. | (a) Define gene mutation. Discuss different types of substitution mutation. [L 4; CLO (1, 2)] | 04 |
| | (b) How does the addition or deletion of a single base alter the reading frame? Explain with examples. [L 3, CLO 3] | 03 |
| | (c) Describe the effects of gene mutation. [L 6, CLO 5] | 03 |



[Question of Term Final Examination]
Khulna University

School: Life Science	Discipline: Biotechnology and Genetic Engineering	Program: Bachelor
Year: 1 st	Term: 2 nd	Examination Year: 2026
Course Code: 0512 07	BGE 1205	Session: 2024-25
Total Marks: 60	Time: 3 Hours	Course Title: Biomolecules
		Credit: 3.0

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate script for each section.

Section-A

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

Question no.	Question Description	Marks
1. (a)	Define biomolecules. List different types of biomolecules, mentioning their functions in biological system. [L 1; CLO 1]	04
(b)	What is enantiomer? How stereogenic center play role in stereoisomerism? Explain with an example. [L (1, 2); CLO 1]	03
(c)	Define and explain conformational stereoisomer with examples. [L (1, 3); CLO 1]	03
2. (a)	Classify monosaccharide. Discuss the structural and functional role of carbohydrates in the biological system. [L 2; CLO 1]	04
(b)	Define glycoprotein and glycolipid. Discuss the functions of glycoproteins and glycolipids in the biological system. [L (1, 3); CLO 2]	03
(c)	What is a capsular polysaccharide? Write the functions of galactogen and inulin. [L (1, 2); CLO 2]	03
3. (a)	Discuss the structural role of chitin and pectin in different organisms, with their commercial use. L 4, CLO 1	03
(b)	Write the basic differences between glycogen and starch. [L 3, CLO 2]	03
(c)	“Lipid serves as storing energy and signaling molecules”-explain with examples. [L 5, CLO 2]	04

4. (a) Differentiate between low-density lipoprotein (LDL) and high-density lipoprotein (HDL). Discuss the health benefits of omega-3 fatty acids. [L (2, 4), CLO 2] 04
- (b) Define lipolysis. Illustrate lipolysis and metabolism of fatty acids. [L (1, 4); CLO 1] 03
- (c) Write a brief note on sterol. [L 3, CLO 2] 03

Section-B

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

Question no.	Question Description	Marks
5. (a)	Classify amino acids based on their R-group and outline the characteristic features of each group. [L 2, CLO 1]	03
(b)	State and explain the Lambert-Beer law with proper illustration. [L (1, 2); CLO 1]	03
(c)	Explain the titration curve of 0.1 M glycine at 25°C. Discuss the key information that can be derived from the said titration curve. [L (5, 6); CLO 2]	04
6. (a)	Classify proteins based on their biological function. [L 2; CLO 1]	03
(b)	Describe the different secondary structures generally found in proteins. [L 2; CLO 1]	04
(c)	Illustrate and explain the ion-exchange chromatography for the separation of proteins. [L 2; CLO 1]	03
7. (a)	Outline the properties of nucleotide bases. [L2; CLO 1]	04
(b)	Explain the double helical structure of DNA proposed by Watson and Crick. [L 5; CLO 1]	04
(c)	Narrate Chargaff's rule on base composition of DNA. [L 1; CLO 1]	02
8. (a)	Narrate the Avery-MacLeod-McCarty experiment and discuss the experimental finding. [L (1, 6); CLO 2]	04
(b)	Explain the hydrolysis of DNA under alkaline conditions and interpret its biological significance. [L 5, CLO 1]	03
(c)	Illustrate and explain the denaturation and renaturation property of dsDNA. [L 2, CLO 2]	03



[Question of Term Final Examination]
Khulna University

School: Life Science	Discipline: Biotechnology and Genetic Engineering	Program: Bachelor
Year: 1 st	Term: 2 nd	Examination Year: 2026
Course Code: 0533 07 Phy 1263	Course Title: Physics	Session: 2024-25
Total Marks: 60	Time: 3 Hours	Credit: 2.0

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- Use separate script for each section.

Section-A

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

Question no.	Question Description	Marks
1.	(a) Make the relation between surface tension and surface energy. [L 2; CLO 1]	03
	(b) What do you mean by a capillary tube? Develop the theory of measuring the surface tension of a liquid. (L 3, CLO 1)	05
	(c) The diameter of a capillary tube is 0.5 mm. It is dipped in water of surface tension $80 \times 10^{-3} \text{ Nm}^{-1}$ and density 10^3 kgm^{-3} . What is the height of the water in the tube? (L 4, CLO 1)	02
2.	(a) State and explain Kepler's laws of planetary motion. (L 1, CLO 1)	03
	(b) How the acceleration due to gravity varies with height. (L 1, CLO 1)	04
	(c) If the orbital radius of Mars is 1.52 times greater than that of the Earth, then determine how much time is taken by the Mars to complete one rotation around its orbit. (L 3, CLO 1)	03
3.	(a) Define the coefficient of viscosity. (L 2, CLO 2)	02
	(b) Show that $p + \rho gy + 1/2 \rho v^2 = \text{constant}$, where the symbols have their usual meaning. (L 6, CLO 2)	06
	(c) Water flows through a horizontal pipeline of varying cross-section. At a point where the pressure of water is 0.05 m of Hg, the velocity of flow is 0.25 m/s. Calculate the pressure at another point where the velocity of flow is 0.4 m/s. Density of water = 10^3 kg/m^3 ; $g = 9.8 \text{ m/s}^2$. (L 3, CLO 1)	02

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| 4. | (a) | Derive the differential equation of simple harmonic oscillations. (L 1, CLO 2) | 03 |
| | (b) | Explain the V-I characteristics curve of a P-N junction. (L 4, CLO 3) | 04 |
| | (c) | Prove the conservation law of linear momentum. (L 3, CLO 2) | 03 |

Section-B

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

Question no.	Question Description	Marks
5.	(a) Mention the four fundamental constituent parts of heat engine. [L 1, CLO 1]	02
	(b) Deduce the total work done by the Carnot engine as $W = R (T_1 - T_2) \log_e V_2/V_1$ with graphical representation, where the symbols have their usual physical meanings. [L 5; CLO 2]	06
	(c) The opposite faces of a metal plate of 0.2 cm thickness are at different temperatures of 100°C, and the area of the plate is 200 cm ² . If the coefficient of thermal conductivity is 0.2 CGS unit, then find the quantity of heat that will flow through the plate in one minute. [L 6; CLO 3]	02
6.	(a) What do you mean by the Kinetic theory of gases? Mention its five properties. [L 2; CLO 3]	04
	(b) Derive the equations for the values of critical temperature, pressure, and volume? [L 6; CLO 2]	06
7.	(a) Define emissive and absorptive powers. [L 1; CLO 2]	04
	(b) State and explain Kirchhoff's law with importance. [L 1; CLO 2]	03
	(c) Shortly explain the spectrum of electromagnetic radiation. [L 3; CLO 4]	03
8.	(a) What do you mean by Photon? [L 1; CLO 2]	02
	(b) Explain- (i) Corpuscular, and (ii) Quantum theory of light. [L 1, CLO 3]	06
	(c) Define Ultrasonic sound. [L 1, CLO 4]	02



[Question of Term Final Examination]
Khulna University

School: Life Science	Discipline: Biotechnology and Genetic Engineering	Program: Bachelor
Year: 1 st	Term: I I	Examination Year: 2026
Course Code: 0531 07 Chem 1257		Session: 2024-25
Total Marks: 60	Time: 3 Hours	Course Title: Organic Chemistry and Spectroscopy
		Credit: 3.0

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate script for each section.

Section-A

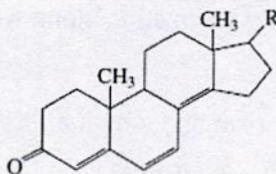
There are four (04) questions in this section. Answer any three (03) questions.

Question no.	Question Description	Marks
1. (a)	Discuss <i>sp</i> ³ , <i>sp</i> ² , and <i>sp</i> hybridization along with their examples. [L 2; CLO 1]	05
(b)	Explain geometric isomerism and why it arises. Write the structural formula of <i>(E)</i> -3-methyl-2-pentene. [L 2, CLO 1]	05
2. (a)	What are the radicals? Illustrate the mechanism of a free radical reaction. [L 2; CLO 2]	05
(b)	Draw the mechanism of <i>E</i> _i reaction of an alkyl halide and the energy profile diagram. Write an example of neutral nucleophiles and negatively charged nucleophiles. [L 3; CLO 2]	05
3. (a)	Write the factors that affect the solubility of an organic compound. Illustrate the resonance of benzene. [L 3, CLO 1]	05
(b)	Explain polar protic solvents and polar aprotic solvents. Propose what happens when NaBr dissolves in acetone. [L 5, CLO 2]	05
4. (a)	Predict what will happen when phenol is treated with CO ₂ under pressure in the presence of NaOH. Design the mechanism of this reaction. [L 6, CLO 2]	05
(b)	Show the mechanism of Friedel Crafts acylation of CH ₃ COCl in the presence of AlCl ₃ . [L2, CLO 2]	05

Section-B

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

Question no.	Question Description	Marks
5. (a)	For a simple harmonic vibrational oscillation, draw the energy level diagram and justify that the transitions between vibrational energy levels can be represented by $\epsilon_{v+1 \rightarrow v} = \bar{\omega}_{osc}$. Define individual terms. [L5; CLO3]	5
(b)	C-F, C-Cl, C-Br, and C-I bonds show IR peaks at 1050cm^{-1} , 725cm^{-1} , 650cm^{-1} , and 550cm^{-1} respectively. Explain the trend. [L2; CLO2]	5
6. (a)	Construct a scheme of the electronic energy levels $\sigma, \pi, n, \sigma^*, \pi^*$ and show the electronic excitations. [L5; CLO3]	6
(b)	Estimate λ_{max} of the following compound:	4



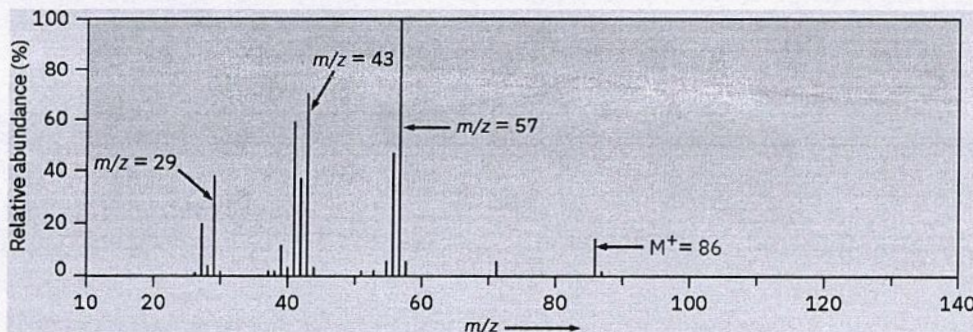
[L6; CLO3]

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|----|-----|---|---|
| 7. | (a) | Illustrate the instrumentation of NMR machine. [L2; CLO3] | 5 |
| | (b) | Show a scheme of an electron multiplier used in a mass spectrometer. [L2; CLO3] | 5 |
| 8. | (a) | What is the reason of following NMR chemical shift of the compounds? | 5 |

Compound:	CH_3F	CH_3Cl	CH_3Br
Chemical Shift:	4.26	3.05	2.68

[L4; CLO2]

- | | | |
|-----|---|---|
| (b) | Estimate the structure of an alkane with the following Mass spectrum: | 5 |
|-----|---|---|



[L6; CLO3]



[Question of Term Final Examination]
Khulna University

School: Life Science Discipline: Biotechnology and Genetic Engineering Program: Bachelor
Year: 1st Term: 2nd Examination Year: 2026 Session: 2024-25
Course Code: 0231 07 Eng 1261 Course Title: Communicative English
Total Marks: 60 Time: 3 Hours Credit: 3.0

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate script for each section.

Section-A

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

Question no.	Question Description	Marks
1.	(a) Change the words according to the directions and make sentence with: (i) Success (Adjective) (ii) Determine (Noun) (iii) Systematic (Adverb) (iv) Management (Verb) (v) Participate (Noun) [L 2; CLO 1]	05
	(b) Make sentences using the following structures: (i) Subject + Linking Verb + Subject (ii) Subject + Transitive Verb + Complement Indirect Object + Direct Object (iii) Subject + Transitive Verb + Object (iv) Subject + Intransitive Verb (v) Gerund + Verb + Complement [L 3; CLO 3]	05
2.	(a) Show how we can form new words using the following word-formation techniques: (a) Affixation (b) Compounding [L3' CLO 1]	10
3.	(a) Choose the correct answer in parentheses and write the correct sentence. (i) The collection of rare books _ (was, were) donated to the library yesterday. (ii) Neither the professor nor the students _ (has, have) reached the venue yet. (iii) Economics _ (is, are) a challenging subject for many freshmen. (iv) The furniture in this room _ (look, looks) quite antique. (v) Everyone in the class _ (needs, need) to submit their assignment by Friday [L6; CLO 2]	05
	(b) Complete the following sentences using "must not" or "do not have to" (i) You _ tell anyone; it is a strictly confidential matter. (ii) You _ wear a tie to the picnic; it is an informal gathering.	05

(iii) The instructions say we _ leave the exam hall before the first hour is over.

(iv) We _ arrive early to the party, but it is better if we do.

(v) A person _ become rich and famous in order to live a successful life.

[L3; CLO 2]

4. (a) Write notes on the following strategies:

10

(a) Skimming and Scanning (b) Intensive and extensive reading [L4, CLO 2]

Section-B

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

Question no.	Question Description	Marks
5.	(a) Illustrate the importance of active listening. [L2' CLO 5]	05
	(b) Define the art of good speaking. [L1' CLO 4]	05
6.	(a) What is non-verbal communication? [L1; CLO 4]	02
	(b) Demonstrate some voice cues in speaking. [L2' CLO 4]	08
7.	Discuss how a public speaker should build rapport with the audience. [L5; CLO 4]	10
8.	The table below shows how patients evaluated different services at three health centers. Summarize the information by selecting and reporting the main features, and make comparisons where relevant. [L4; CLO 3]	10

Aspect of service	(1=Very poor; 10=excellent)		
	Longston Centre	Peveril Centre	Marchbank Centre
Booking appointments	5.2	9.1	7.8
Doctors' service	8.0	8.7	8.4
Care of children	6.3	7.5	7.3
Pharmacy	5.1	6.3	5.8
Response to concerns	4.3	9.6	6.5
Overall average	5.8	8.3	7.2