

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION MARCH 2026
FOURTH SEMESTER
MG4DSCBIF202-DATA STRUCTURES & ALGORITHM
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

**Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest() and Appreciation(Ap)**

**Students should attempt at least one question from each course outcome to enhance
their overall outcome attainability**

Part A

Short Answer Questions

Answer any 5 out of 7 Questions

Each question carries 2 marks

1. Define problem solving in programming. [U][CO1]
2. Recall algorithm? [U][CO1]
3. Define Abstract Data Type (ADT). [U][CO1]
4. What is time complexity? [U][C02]
5. Define stack. [U][CO4]
6. What is a queue? [K][C04]
7. What is linear search? [K][C06]

[2 x 5 = 10]

Part B

Short Essay Questions

Answer any 4 out of 6 Questions

Each question carries 5 marks

8. Describe the characteristics of a good algorithm. [U][CO1]
9. Explain arrays as an ADT with examples. [U][CO1]
10. Summarize singly linked list and its advantages. [U][CO3]

11. Explain stack operations: push and pop. [U][CO4]
12. Explain queue operations: insertion and deletion. [U][CO4]
13. Discuss divide and conquer method with a simple example. [U][CO5]

[5 x 4 = 20]

Part C

Long Essay Questions

Answer ALL questions

Each question carries 10 marks

14. Outline time and space complexity of algorithms. Discuss best case and worst case. [U][CO2]
15. Explain arrays and linked lists. Compare their advantages and disadvantages. [U][CO3]
16. Describe stack and its applications in detail. [U][CO4]
17. Explain sorting techniques: Bubble sort and Selection sort with examples. [U][CO6]

[10 x 2 = 20]

END OF QUESTION PAPER

QP CODE

Reg. No:.....

Name:.....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION MARCH 2026
FOURTH SEMESTER
DSC A- MG4DSCBIF201-GENOMICS AND COMPUTATIONAL GENOMICS
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

**Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation(Ap)**

Students should attempt at least one question from each course outcome to enhance their
overall outcome attainability

Part A

Short Answer Questions

Answer any 5 Questions

Each Question carries 2 marks

- | | |
|-----------------------------------------------------------|------------|
| 1. Observe basic features of gene. | [U]/[CO1] |
| 2. Discuss RFLP. | [U]/[CO2] |
| 3. Discuss on Bac to Bac sequencing. | [Ap]/[CO3] |
| 4. Memorize nuclear genome. | [K]/[CO4] |
| 5. Discover the role of Functional RNA's in human genome. | [A]/[CO5] |
| 6. Describe regulatory elements. | [Ap]/[CO6] |
| 7. Discover more on metagenomics. | [A]/[CO7] |
| | [5x2=10] |

Part B

Short Essay Type Questions

Answer any 4 Questions

Each Question carries 5 marks.

- | | |
|--------------------------------------------------------|------------|
| 8. Interpret prokaryotic genome in detail. | [U]/[CO1] |
| 9. Summarize genetic mapping. | [U]/[CO2] |
| 10. Identify the ethical issue related to sequencing ? | [Ap]/[CO3] |
| 11. Interpret nuclear and mitochondrial genome. | [K]/ [CO4] |
| 12. Discover types of RNA's . | [A]/[CO5] |
| 13. Examine the role of Genomic tool. | [A][CO7] |
| | [4x5 = 20] |

Part C

Long Essay Type Questions

Answer any 2 Questions

Each Question carries 10 marks

14. Distinguish between prokaryotic and eukaryotic genome.

[U]/ [CO1]

15. Explain the outcome and applications of HGP

[Ap]/ [CO3]

16. Explain microarray and its types.

[Ap]/ [CO6]

17. Write a note on different genomic tools.

[A]/ [CO7]

[2x10 = 20]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION MARCH 2026
FOURTH SEMESTER

MG4DSCBIF200-MOLECULAR STRUCTURES IN BIOINFORMATICS PERSPECTIVE
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

**Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest() and Appreciation(Ap)**

**Students should attempt at least one question from each course outcome to enhance
their overall outcome attainability**

Part A

Short Answer Questions

Answer any 5 out of 7 Questions

Each question carries 2 marks

1. Commend on protein structure prediction.[Ap][CO1]
2. Acknowledge homology modeling? [S][CO2]
3. Acknowledge secondary structure of protein? [S][CO2]
4. Commend on Ramachandran plot? [Ap][CO1]
5. Acknowledge any two secondary structure prediction tools. [S][CO2]
6. Comprehend RNA secondary structure prediction? [A][C04]
7. Write any two protein structure validation tools.[A][C03]

[2 x 5 = 10]

Part B

Short Essay Questions

Answer any 4 out of 6 Questions

Each question carries 5 marks

8. Commend on the gap between protein sequence and structure. [Ap][CO1]
9. Commend Phi and Psi angles and their significance in protein structure. [Ap][CO1]
10. Acknowledge Chou-Fasman method for secondary structure prediction. [S][CO2]

11. Demonstrate homology modeling steps in brief. [S][CO2]
12. Write a note on RNA secondary structure prediction using MFold. [A][CO4]
13. Outline protein structure validation and its importance. [An][CO3]

[5 x 4 = 20]

Part C

Long Essay Questions

Answer any 2 out of 4 Questions

Each question carries 10 marks

14. Assemble secondary structure prediction methods and tools. [S][CO2]
15. Plot glycomics tools in detail. [A][CO5]
16. Acknowledge tertiary structure prediction approaches including ab initio and threading methods. [S][CO2]
17. Write a note on nucleic acid structure prediction and tools. [A][CO4]

[10 x 2 = 20]

END OF QUESTION PAPER

QNSMARTI:H:QPCODE

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) QNSMARTI:H:EXCAPSTYPE EXAMINATION
QNSMARTI:H:Y:MONTH QNSMARTI:H:Y:YEAR
QNSMARTI:H:S:SEMLETTER SEMESTER
QNSMARTI:H:C:COURSE NATURE - QNSMARTI:H:C:CODE
- QNSMARTI:H:C:CAPSNAME
(QNSMARTI:H:C:REVYEAR ADMISSION ONWARDS)

Duration: 2hrs

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short answer Questions

Answer any **5** questions

Each question carries **2** marks

1. Define **Biostatistics**. [K / CO1]
2. What is a **population** in statistics? [K / CO3]
3. Distinguish between **primary and secondary data**. [U / CO3]
4. What is a **frequency distribution**? [K / CO2]
5. Define **mean**. [K / CO2]
6. What is **probability**? [K / CO3]
7. What is meant by **standard deviation**? [U / CO2]

[2x5 = 10]

Part B

Short Essay Questions

Answer any **6** questions

Each question carries **5** marks

8. Explain the **scope and applications of biostatistics in biological sciences**. [U / CO1]
9. Describe different **types of data** with suitable examples. [U / CO3]
10. Explain the **steps involved in collection and presentation of data**. [U / CO3]
11. Calculate the **mean and median** for the given data set. [A / CO2]
12. Explain **measures of dispersion**. [U / CO2]
13. Describe the **addition and multiplication laws of probability**. [U / CO3]
14. Explain **normal distribution** and mention its properties. [U / CO3]
15. Write a short note on **correlation**. [U / CO4]

[5x6 = 30]

Part C

Long Essay Questions

Answer any **3** questions
Each question carries **10** marks

16. Explain in detail the **methods of data classification and tabulation**. [An / CO3]
17. Discuss **measures of central tendency** with merits and demerits. [An / CO2]
18. Explain **probability distributions** with special reference to binomial distribution. [An / CO3]
19. Describe **correlation and regression analysis** and their applications in bioinformatics. [An / CO4]
20. Explain the **role of biostatistics in bioinformatics research and decision making**. [E / CO1]

[10x3 = 30]

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION MARCH 2026
FOURTH SEMESTER
DSE- MG4DSEBIF201- CELLULAR ENZYMOLOGY
(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

**Remember(K), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create(C), Skill(S),
Interest() and Appreciation(Ap)**

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability

Part A

Short Answer Questions

Answer any 5 out of 7 Questions

Each Question carries 2 marks

- | | |
|-----------------------------------------------------------------------------------------|------------|
| 1. Explain transferases with one example | [U]/[CO1] |
| 2. Describe Reversible enzyme inhibition | [U]/[CO3] |
| 3. What is meant by an apoenzyme? | [K]/[CO2] |
| 4. Name any two coenzymes involved in oxidation-reduction reactions | [U]/[CO4] |
| 5. State the significance of enzymes on reducing activation energy | [U]/[CO5] |
| 6. Define diagnostic enzymes. | [K]/[CO6] |
| 7. Differentiate between apoptosis and necrosis based on their biological consequences. | [An]/[CO7] |
| | [5x2=10] |

Part B

Short Essay Type Questions

Answer any 6 out of 8 Questions

Each Question carries 5 marks.

- | | |
|-------------------------------------------------------------------------------------------|-----------|
| 8. Define enzyme as biological catalysts with suitable examples | [K]/[CO2] |
| 9. Describe ribozymes and its biological significance. | [U]/[CO4] |
| 10. Explain the effect of temperature on enzyme activity | [U]/[CO4] |
| 11. Explain the Michaelis- Menton model of enzyme action | [U]/[CO5] |
| 12. Describe the role of enzymes in drug discovery and development. | [U]/[CO6] |
| 13. Describe enzyme turn over number. | [U]/[CO3] |
| 14. Analyze the working of the Na ⁺ -K ⁺ pump and explain why it is | |

essential for cellular function.

[An]/[CO7]

15. Explain the lock and key model of enzyme–substrate interaction with a diagram.

[U]/[CO1]

(6x5 =30)

Part C

Long Essay Type Questions

Answer any 3 out of 5 Questions

Each Question carries 10 marks

16. Explain the Lineweaver-Burk plot, its derivation and importance in enzyme kinetics.

[U]/[CO5]

17. Explain the effect of inhibitors and activators on enzyme.

activity, classify inhibitors and describe their mechanism of action. [U]/[CO4]

18. Recall the concept of personalized medicine with special reference to enzyme polymorphism and pharmacogenomics.

[K]/[CO6]

19. Compare and contrast structural organization of prokaryotic and eukaryotic cells.

[An/CO7]

20. Summarize enzyme inhibition and its types.

[U]/[CO3]

(3x10 = 30)

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- QNSMARTI:H:C:CAPSNAME
(QNSMARTI:H:C:REVYEAR ADMISSION ONWARDS)

Duration: 1hr 30min

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

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Part A

Short answer Questions

Answer any **5** questions

Each question carries **2** marks

1. Write any two **laboratory safety rules**. [U / CO1]
2. Define **aseptic technique**. [U / CO1]
3. What is meant by **pure culture**? [U / CO3]
4. Define **DNA extraction**. [U / CO4]
5. What is the role of **agar** in culture media? [U / CO3]
6. What is **PCR**? [U / CO5]
7. Name any two **types of staining techniques**. [K / CO3]

[2x5 = 10]

Part B

Short Essay Questions

Answer any **4** questions

Each question carries **5** marks

8. Explain the importance of **laboratory safety and biosafety measures**. [U / CO1]
9. Describe the **general characteristics of microorganisms**. [An / CO2]
10. Explain different **culture media** used for bacterial growth. [U / CO3]
11. Describe the **steps involved in isolation of bacteria**. [A / CO3]
12. Explain the **principle and steps of DNA extraction**. [A / CO4]
13. Describe the **principle and applications of PCR**. [A / CO5]

[5x4 = 20]

Part C

Long Essay Questions

Answer any **2** questions

Each question carries **10** marks

14. Discuss **laboratory safety measures, sterilization methods, and waste disposal practices.** [An / CO1]
15. Explain the **morphological and cultural characteristics of bacteria** with suitable examples. [An / CO2]
16. Describe in detail the **DNA extraction and quantification techniques.** [An / CO4]
17. Explain the **principle, procedure, and applications of PCR.** [An / CO5]

[10x2 = 20]

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(QNSMARTI:H:C:REVEYEAR ADMISSION ONWARDS)

Duration: 1hr 30min

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

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Part A

Short answer Questions

Answer any **5** questions

Each question carries **2** marks

1. Define **nutrition**. [U / CO1]
2. What is meant by **balanced diet**? [U / CO1]
3. Define **malnutrition**. [U / CO5]
4. What is a **deficiency disease**? [U / CO5]
5. What are **macronutrients**? [U / CO1]
6. What is meant by **mental wellness**? [U / CO7]
7. Define **yoga**. [U / CO8]

[2x5 = 10]

Part B

Short Essay Questions

Answer any **4** questions

Each question carries **5** marks

8. Explain the **importance of nutrition in maintaining health**. [U / CO1]
9. Describe the **nutritional composition of common food groups**. [An / CO2]
10. Explain the **role of micronutrients in human health**. [U / CO1]
11. Evaluate the **nutritional value of cereals, pulses, and vegetables**. [E / CO2]
12. Discuss **deficiency diseases and their prevention**. [U / CO5]
13. Explain the **role of diet in mental health disorders**. [An / CO6]

[5x4 = 20]

Part C

Long Essay Questions

Answer any **2** questions

Each question carries **10** marks

14. Discuss the **principles of nutrition and their role in health and disease prevention.** [An / CO1]
15. Evaluate different **nutrition programmes** and their impact on public health. [E / CO3]
16. Analyze the **relationship between diet, nutrition, and mental health.** [An / CO6]
17. Explain how **nutritional knowledge can be applied to promote mental wellness.** [A / CO7]

[10x2 = 20]