

**VIJAYA COLLEGE**  
R.V Road, Basavanagudi, Bengaluru-560 004  
**IV Semester B.Sc., MODEL QUESTION PAPER**  
**Subject: GENETICS**  
**Paper-GNT 401: MOLECULAR GENETICS**

**Time: 3 Hrs**

**Max.Marks: 70**

**PART – A**

**I Answer any FIVE of the following:**

**(5x5=25)**

- 1) What is operon?
- 2) Write a note on wobbling hypothesis?
- 3) Name the components of RNA polymerase?
- 4) What are mutagens?
- 5) Give the silent features of nonsense mutation.
- 6) List any three beneficial effect of mutation.
- 7) What are lac operon?

**PART – B**

**II Answer any FIVE of the following:**

**(5x5=25)**

- 1) Explain the “Rho” dependent transcription termination.
- 2) Give the salient features of Genetic code.
- 3) List the differences between the physical and chemical mutagens.
- 4) Write a note on photoreactivation DNA repair mechanism.
- 5) Explain reverse mutation in bacteria.
- 6) Explain post transcriptional modification process in eukaryotes.
- 7) Explain SOS repair mechanism.

**PART – C**

**III Answer any ONE of the following:**

**(10x1=10)**

- 1) With labeled diagram explain the Frame shift mutation and add a note on its function.
- 2) Explain : a)chemical mutagens  
b) mismatch repair.

**PART – D**

**IV Answer any ONE of the following:**

**(10x1=10)**

- 1) Explain Tryptophan operon.
- 2) Enumerate the steps involved in the translation of prokaryotes.

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**PART – A**

**I Answer any FIVE of the following:**

**(5x5=25)**

1. What is mutation?
2. What are genetic code?
3. What is inducible operon?
4. What is pribnow box?
5. Give the silent features of nonsense mutation.
6. List any three harmful effect of mutation.
7. What is foot printing?

**PART – B**

**II Answer any FIVE of the following:**

**(5x5=25)**

8. Explain the “Rho” independent transcription termination.
9. Give a detail account on processing of mRNA.
10. Add a short notes on Base substitution.
11. Write a note on excision DNA repair mechanism.
12. Explain the structural component of tryptophan operon
13. Describe post translational modification process in eukaryotes.
14. Explain post replicational repair mechanism.

**PART – C**

**III Answer any ONE of the following:**

**(10x1=10)**

1. Explain the Transcription in prokaryotes
2. Explain :
  - a) physical mutagens
  - b) RNA polymerase in eukaryotes.

**PART – D**

**IV Answer any ONE of the following:**

**(10x1=10)**

1. Explain lac operon.
2. Enumerate the steps involved in the translation of eukaryotes.

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*Instructions: i) Draw diagrams wherever necessary*

**PART - A**

I Answer any **five** of the following:

5X3=15

1. What are purines? Mention them.
2. Differentiate between B-DNA and Z-DNA.
3. Write a note on muton.
4. What is helicase enzyme add a note on its usage in DNA replication.
5. Explain ribozymes.
6. What is genetic code? Mention the three non - stop codons.
7. Explain substitution mutation with suitable example.

**PART – B**

II Answer any **five** of the following:

5X5=25

8. Explain Griffith experiment to prove DNA acted as genetic material.
9. Differentiate between nucleosides and nucleotides.
10. Give an account on initiation of DNA replication in prokaryotes.
11. Explain the structure of clover leaf model of t RNA.
12. Describe the operon model for regulation of gene activity.
13. Write an explanatory note on conjugation in bacteria.
14. Discuss P elements in Drosophila.

**PART –C**

III Answer any **two** of the following:

2X10=20

15. Describe the double helical structure of DNA.
16. Explain in detail the mechanism of eukaryotic translation.
17. Discuss in detail about enzymology of DNA replication.
18. Explain. a) Rolling circle model b) Meselson and Sthal experiment.

**PART – D**

III Answer any **one** of the following:

1X10=10

19. Describe the properties of genetic code.
20. Explain the process of transduction in bacteria.

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*Instructions: i) Draw diagrams wherever necessary*

**PART - A**

I Answer any **five** of the following:

5X3=15

- 1 What are pyrimidines? Mention them.
- 2 Explain prokaryotic m RNA.
- 3 Write a note on ligase enzyme
- 4 What is transduction in bacteria mention its types
- 5 Explain ribozymes.
- 6 What are transposons? Give an example for transposon in maize.
- 7 Explain substitution mutation with suitable example.

**PART – B**

II Answer any **five** of the following:

5X5=25

- 1 Explain Hershey and Chase experiment to prove DNA acted as genetic material.
- 2 Write an explanatory note on conjugation in bacteria.
- 3 Give an account of DNA polymerase in prokaryotes.
- 4 Give an account on termination of DNA replication in eukaryotes.
- 5 Explain important properties of genetic code.
- 6 Describe the operon model for regulation of gene activity.
- 7 Discuss transposons in Drosophila.

**PART –C**

III Answer any **two** of the following:

2X10=20

1 Describe the clover leaf structure of t RNA.

2 Explain in detail the mechanism of prokaryotic transcription.

3 Discuss in detail about enzymology of DNA replication.

4 Explain. A) Rolling circle model b) types of DNA replication.

**PART – D**

IV Answer any **one** of the following:

1X10=10

1. Describe in detail types of gene mutation.

2 Explain the process of DNA replication in prokaryotes.

