

# KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages)

Reg. No:.....

Question Code: 26E01607

Course Code: 24PMMB32

PG Degree - End Semester Examinations, April 2026

Third Semester

M.Sc., MICROBIOLOGY

Molecular Biology and Recombinant DNA Technology

(For those who joined in July 2024 onwards)

Time : 3Hours

Maximum : 75 Marks

## PART - A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

- CO:1 1. Generally, r RNA constitutes \_\_\_\_\_% in the cellular RNA.  
K:1 (a) 20 (b) 40  
(c) 60 (d) 80
- CO:1 2. Which organelle is considered as the central site for protein  
K:2 modification and trafficking?  
(a) Lysosome (b) Mitochondria  
(c) Nucleus (d) Golgi apparatus
- CO:1 3. Which of the following statements about enhancers is true?  
K:1 (a) They can only be located upstream of the gene.  
(b) They can be located within the intron of the gene.  
(c) They function in a specific orientation only.  
(d) They are responsible for DNA replication speed.
- CO:1 4. What is the active form of the *trp* repressor?  
K:2 (a) Monomer (b) Trimer  
(c) Dimer (d) Tetramer
- CO:1 5. What type of bond does DNA ligase form between adjacent  
K:1 nucleotides?  
(a) Ionic bond (b) Hydrogen bond  
(c) Phosphodiester bond (d) Glycosidic bond

- CO:1 6. Why do we use c DNA for gene cloning?  
K:2 (a) It is circular (b) Lacks introns  
(c) Contains Introns (d) Easy to sequence
- CO:1 7. What is the approximate size of DNA fragments that can be cloned  
K:1 using cosmids?  
(a) 1- 10 kb (b) 20-30 kb  
(c) 35-45 kb (d) 75-100 kb
- CO:1 8. Select the enzyme used in pyrosequencing for the conversion of  
K:2 *PPi* to ATP.  
(a) DNA Polymerase (b) ATP Sulfurylase  
(c) Apyrase (d) Luciferase
- CO:1 9. Mr Ian Wilmut is associated with \_\_\_\_\_  
K:1 (a) Mabs Production (b) Gene Theraphy  
(c) Genetically Modified Plant (d) Animal Cloning
- CO:1 10. Choose the enzymes useful for the formation of callus  
K:2 (a) Auxin (b) Gibberlin  
(c) Absciscic acid (d) Ehylene

**PART - B (5 X 5 = 25 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 250 words.**

- CO:2 11. (a) Describe the properties of mRNA.  
K:2 **(OR)**  
(b) Explain the concept behind Wobble hypothesis.
- CO:3 12. (a) Explain the principle and applications of Ame's Test.  
K:2 **(OR)**  
(b) Describe the features of promotor.
- CO:2 13. (a) Describe the structure of pBR322 with a neat sketch.  
K:2 **(OR)**  
(b) Explain the mechanism of microinjection.
- CO:3 14. (a) Analyze the importance of RFLP.  
K:4 **(OR)**

(b) Analyze the features of DNA chip.

CO:2 15. (a) Apply the applications of gene therapy.

K:3

**(OR)**

(b) Comment on the types of media used for animal cell culture.

**PART - C (5 X 8 = 40 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 600 words.**

CO:5 16. (a) Write in detail about the enzymology and mechanism of semi-conservative DNA replication with a neat sketch.

K:2

**(OR)**

(b) Describe the steps involved in translation.

CO:4 17. (a) Analyze the components and mode of expression of *Lac* operon with a diagram.

K:4

**(OR)**

(b) Explain and compare of DNA repairing systems different DNA repair mechanisms in microbe.

CO:2 18. (a) Explain the definition, properties, types and applications restriction endonucleases.

K:2

**(OR)**

(b) Describe the different types of plant vectors used in plant biotechnology.

CO:3 19. (a) Analyze the importance and applications of PCR in modern technological era of biological research.

K:4

**(OR)**

(b) Explain the applications of protein engineering.

CO:2 20. (a) Write in detail the varied concepts of sterilization in modern world.

K:2

**(OR)**

(b) Describe transgenic plants and their applications.