

**PGIVS-007-B-21**  
**M.Sc. IV Semester (CBCS) Degree Examination**  
**BIOCHEMISTRY**  
**Molecular Biology - I**  
**Paper : HCT - 4.1**

**Time : 3 Hours****Maximum Marks : 80****Instructions to Candidates:**

Answer question **No.1** and any **four** of the remaining.

1. Answer any **Ten** of the following: **(10×2=20)**
- a) State one gene one enzyme hypothesis. Mention its limitations.
  - b) What are tandem gene clusters?
  - c) What are Balbiani rings? Mention their significance.
  - d) What are Hfr strains?
  - e) Mention role of rec A protein.
  - f) Depict primosome complex.
  - g) What is frame shift mutation?
  - h) How are thymine dimers formed in DNA?
  - i) What is uvr complex?
  - j) Mention role of SSB proteins.
  - k) What is mutagenecity?
  - l) What is nick translation?
2. a) Discuss experimental evidences that prove DNA as a genetic material.  
b) Explain various levels of nucleosome organisation. **(7+8=15)**
3. a) Describe structure and functions of mitochondrial DNA and chloroplast DNA  
b) What is conjugation? Explain its role in mapping of bacterial chromosome.

**(7+8=15)**

4. a) Discuss Messelson Stahl experiment.  
b) Describe initiation and elongation steps in prokaryotic replication. (7+8=15)
  5. a) What are ARS? Add a note on composition and function of yeast ORC.  
b) Discuss mitochondrial DNA replication. (7+8=15)
  6. a) Discuss Lederberg replica plating technique.  
b) Describe nucleotide excision repair mechanism. (7+8=15)
  7. Write notes on any three of the following. (3×5=15)
    - a) Histone genes
    - b) Transposons
    - c) Ames test
    - d) Photoactivation
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**PGIVS-009-B-21**  
**M.Sc. IV Semester (CBCS) Degree Examination**  
**BIOCHEMISTRY**  
**Recombinant DNA Technology and Bioinformatics**  
**Paper : SCT - 4.1**

**Time : 3 Hours****Maximum Marks : 80****Instructions to Candidates:**

Answer Question 1 and answer any five from the remaining questions.

1. Answer the following. (2×10=20)
- a) Distinguish between exonucleases and endonuclease with an example for each.
  - b) What are selectable marker and scorable markers?
  - c) Write the principle of Western blotting.
  - d) Define probe and primer.
  - e) State the principle and applications of restriction fragment length polymorphism.
  - f) How is structure and functions of a gene studied?
  - g) Give the composition and enlist the components of a typical animal cell culture medium.
  - h) What is heterologous gene expression? Mention any two applications?
  - i) Define hybrids and cybrids.
  - j) Expand and define RDBMS.
  - k) Enlist similarities and differences in sequence retrieval and sequence search databases.
  - l) Define genome and proteome.
2. a) Define vector. Discuss on different vectors that are used in molecular cloning.
- b) What is recombinant DNA? Write a note on methods for introduction of recombinant DNA into host cells. (7+8=15)

3. a) Explain about construction and screening of genomic libraries for desired genes.  
b) Write a note on applications of recombinant DNA technology. (7+8=15)
4. a) Describe gene transfer into mammalian cells. Add a note on transgenic animals.  
b) Explain protoplast transformation. Add a note on plant cloning vectors. (7+8=15)
5. a) Define data and databases? Discuss on classification of biological databases.  
b) What are FASTA and BLAST? Write a note on multiple sequence alignment. (7+8=15)
6. a) Write a note on different hosts used for cloning of genes.  
b) Discuss on methods and tools for data analysis. (7+8=15)
7. Write short notes on any three of the following. (3×5=15)
- a) Southern blotting
  - b) DNA finger printing
  - c) Transgenic plants
  - d) Protein families
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**PGIVS-008-B-21**  
**M.Sc. IV Semester (CBCS) Degree Examination**  
**BIOCHEMISTRY**  
**Molecular Biology - II**  
**Paper : HCT - 4.2**

**Time : 3 Hours****Maximum Marks : 80****Instructions to Candidates:**

Answer question **I** and any **four** of the remaining questions.

Answer any **ten** of the following:**(10×2=20)**

1.
  - a) What is a promoter? Give its features.
  - b) Write the functions of enhancers.
  - c) What is wobble hypothesis?
  - d) Give the features of eukaryotic ribosomes.
  - e) Explain the action of tetracycline.
  - f) How is reverse transcription carried out?
  - g) How is intron spliced?
  - h) What are the inducers? Give examples.
  - i) Explain the role of leucine zippers in gene regulation?
  - j) Give the significance of chromosomal puffing.
  - k) What is transcriptional repression?
  - l) Name any two transcriptional factors and their functions.
  
2.
  - a) Distinguish between eukaryotic and prokaryotic RNA polymerase.
  - b) Explain the formation of initiation of transcriptional complex in prokaryotes.  
**(7+8=15)**
  
3.
  - a) Explain the structure features of mRNA in eukaryotes.
  - b) Explain the contributions of Nirenberg and Khorana in deciphering the genetic code.  
**(7+8=15)**

4. a) Describe the formation of initiation complex of protein synthesis in prokaryotes.  
b) Discuss the post translational modifications of proteins. (7+8=15)
5. a) Describe the transcriptional control of enzyme induction of in E. coli.  
b) Explain the regulation of gene of tryptophan in E. coli. (7+8=15)
6. a) Explain various modifications of chromatin during regulation of gene in eukaryotes.  
b) How is yeast genes regulated by the presence galactose in the medium?(7+8=15)
7. Write short notes on any **Three** of the Following. (3×5=15)
- a) RNA interference
  - b) Developmental regulation in Drosophila.
  - c) Homonal regulation of a gene.
  - d) tRNA
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